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a review of general semantics

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THE CRITERION OF PREDICTABILITY

ANATOL RAPOPORT *

OUR PROBLEM is to examine the significance of predictability as a criterion for truth and as a measure of freedom. In connection with this inquiry, we shall also examine the significance of true propositions in human affairs.

I. *Verbalized Conflict*

The abstraction 'Truth' plays a central role in a broad range of human activity. It is intimately connected with imperatives of human behavior. In early childhood we are taught that when we utter certain words in certain circumstances, we are 'telling the truth,' and that when we utter other (or even the same) words in other circumstances, we are 'not telling the truth'; and moreover that the former behavior is preferable to the latter.

'Truth' is further connected with 'Reality,' and in this connection has vast ramifications. Tremendous outpourings of mental activity throughout milleniums had as their object the definition and elucidation of 'Truth' and 'Reality.' Metaphysics and later epistemology revolved around these objectives. 'Truth' is also strongly entrenched in ethics as is evidenced by identical designations for 'truth' and 'virtue' in some languages. 'Truth' is supposed to be some object sought in modern science or at least in philosophy of science. So many are the connotations of this short word that it pervades even esthetics, as is shown in the expressions 'true art,' 'poetic truth,' etc. Finally 'Truth' is thought to be embodied in human conflicts, because almost all conflicts are usually verbalized into utterances that appear to be propositions. A group of individuals asserts, 'A is true,' while another group asserts, 'B is true, therefore A is not true.' The actions of each are then attempts to curb the actions of the other.

Actually such verbalisms of conflict are seen to be simply declarations of behavior or intended behavior and must be distinguished from judgments about the external world. However, the fact that they appear as formal propositions, subject to classification as 'true' or 'false' is significant, as we shall attempt to show. The following are examples of verbalized conflict.

EXAMPLE 1.

First Savage: 'This female is mine' (where 'mine' as applied to females denotes certain behavior).

Second Savage: 'No, she is mine (and therefore not yours).'

Each then acts in such a way as to deny to the other opportunities of behavior defined by the expression 'my female.' Such actions result in withdrawal from the sphere of influence of one or the other or in injury or death of one or both or all three.

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EXAMPLE 2.

First Tribe: 'This land is ours.' Again 'our land' is associated with certain behavior.

Second Tribe: 'No, it is ours (therefore not yours).' Each tribe then acts in such a way as to deny to the other behavior which signifies 'my land.' Result: depopulation or impoverishment of one or both tribes.

EXAMPLE 3.

Heretic: 'The earth revolves around the sun.'

Inquisitor: 'No, the sun revolves around the earth. (Therefore the earth does not, etc.).'

Inside the skin of both the heretic and the inquisitor both utterances are defined in terms of behavior. The utterance of the heretic is really a declaration of intention to behave in a certain way, namely, to imagine a fixed framework of space, in which the sun is stationary, while the earth and the planets revolve around it. Perhaps this declaration includes an intention to induce other people to imagine a similar picture. It is this *behavior* of the heretic which the inquisitor intends to prevent. He first tries (if he is a conscientious inquisitor) to induce the heretic to behave in another way, namely, to imagine within the same fictitious framework of space a stationary, centrally located earth with the celestial sphere revolving around it as described by Ptolemy. On the verbal level and in the pictorial imagination the two pictures are incompatible. Finally, the inquisitor takes other steps to prevent the behavior of the heretic incompatible with his own, and the consequences are painful and often fatal for the heretic.

EXAMPLE 4.

First Monarch: 'Prince A is the rightful heir to the throne of X.'

Second Monarch: 'No, Prince B is, etc. (therefore Prince A is not).'

Steps are taken by causing groups of people to behave in such a way that similar groups of people under the control of the other monarch are curbed or annihilated, and the behavior of people indicated by the symbols 'A (or B) is the rightful heir' is made impossible.

EXAMPLE 5.

Hitler: 'A group of people defined as Germans are superior and destined to control, rule, etc.'

Others: 'They are not, etc.'

Appropriate steps are taken with well known results.

The verbalized contradictions given in these examples are contradictions of intended behavior and have nothing to do with 'objective truth.' In fact, if they are to be considered as propositions at all, they are seen to be propositions about the inner state of affairs of the adversaries, and, properly stated, may all be true. Contradictions arise when these utterances are considered as propositions about the external state of affairs, independent of the speaker. Examine the first two examples. The utterance 'This female is mine,' made without further assumptions embodies no verifiable fact. Only its grammatical structure gives it the appearance of a 'proposition.' In reality it is only a signal connected with certain acts. The same is true of the utterances in Examples 4 and 5, taken from actual history. But there may be objections to the assertion that Example 3 is likewise only a behavior contradiction. To a modern informed person it might seem that the heretic and the inquisitor are arguing about a verifiable fact, that it is only necessary to assume an 'objective point of view' in order to investigate the question at hand and decide who is right. Most

informed people suspect the anti-scientific clericals of the Renaissance of sinister 'suppression of truth,' fanaticism, etc. However, a somewhat deeper analysis indicates that in pronouncing such judgments we make certain tacit assumptions, namely that 'objective investigation,' as we understand it, is a preferable method of truth seeking than faith in established authority. In other words, to accuse the inquisitor justly of 'suppressing the truth,' one must assume that the heretic's conception of 'truth' is more justified than the inquisitor's, and if this assumption cannot be further justified, it is again merely a declaration of behavior. It was futile for Galileo to 'prove' that objects of different weights fell at equal speeds. He assumed that his contemporaries should believe what they saw, while they were skeptical of observed phenomena, since the latter might well have been optical illusions originating with the Devil. Is this skepticism less justified than the skepticism of the modern physicist, who will pronounce a swindle any demonstration of perpetual motion no matter how convincing, because it is contrary to the 'Law of Conservation of Energy,' *i.e.,* contrary to vested authority? Well, yes, it *is* less justified, but the justification of the modern point of view must be clearly formulated. Yes, the priests of Pisa were wrong, and the modern physicist right. Yes, the question of the movement of heavenly bodies is to a certain extent a question of observable truth and not of individual behavior, but this must be shown and the *extent of the observer's participation* determined. It is not at all 'obvious.'

In Hayakawa's *Language in Action* the function of language in establishing coöperation between human beings is discussed. This coöperation is established by the extension of the functions of individual nervous systems to include by inter-communication the experiences and observations of others. In this article we approach language from the point of view of its functions in *resolving conflicts.*

Human beings engage in two kinds of conflict, namely 'man against nature' and 'man against man.' Man's success in the first kind of conflict depends very largely on successful coöperation with other men. Here the survival value of language as a coöperation establishing agency becomes apparent. But the success of one man in the second kind of conflict often means the failure of another man. Hence language will have a survival value if it also succeeds in resolving or eliminating this kind of conflict. This function of language will be examined here.

Man-against-man conflicts are usually verbalized into utterances that have the appearance of contradictory propositions. Each pair of such utterances seems to be on one of three levels.

CATEGORY 1. *Conflicts of incompatible behavior.*

(1) 'This female is mine' ($\overline{1}$) 'She is not.'

(2) 'This man is my slave' ($\overline{2}$) 'He is not.'

The contradictions seemingly embodied in these utterances arise from the verbal form, which gives them the appearance of propositions about the external world. When translated into propositions concerning the internal state of affairs of each speaker, the *verbal* contradictions are resolved, for (1) becomes:

(3) 'My nervous impulses lead me to behave so and so toward this female.'

Proposition ($\overline{1}$) becomes:

(4) 'My nervous impulses are such that unfavorable reactions occur inside my skin when you behave as stated.'

Obviously propositions (3) and (4) may both be true. But the 'nervous impulses' described will usually themselves lead to conflict. Hence we call the behavior associated with such pairs of utterances incompatible.

CATEGORY 2. *Compatible behavior leading to conflicts on the verbal levels only.*

(5) 'Oysters are tasty' ($\overline{5}$) 'They are not.'

(6) 'The music of Bach is more inspired than that of I. Berlin.'

Again when these utterances are stated as propositions concerning the internal states of the speakers, they cease to be contradictory. Verbal conflicts arising from them can be resolved by both sides recognizing the 'subjectivity' of their assumptions. The *conflict of behavior,* however, remains. Usually such conflicts of behavior do not lead to destructive struggles. They are on the 'tolerance' level. Still it is sometimes desirable to resolve such conflicts, especially those of esthetics. Attempts are made to do so by appeals to 'valid esthetic truths.' In this article we shall not investigate the question of existence of such truths. We shall, however, investigate the question of the possibility of establishing criteria capable of resolving the conflicts of:

CATEGORY 3. *Contradiction about the external world.*

(7) 'This pencil is red' ($\overline{7}$) 'It is grey.'

(8) 'Vancouver exists' ($\overline{8}$) 'There is no such city.'

(9) 'Gremlins do not exist' ($\overline{9}$) 'They do.'

(10) 'The atomic weight of oxygen is 16' ($\overline{10}$) 'It is 17.'

A restatement in the form 'I believe that . . .' does not resolve the contradictions between these statements as in the case of Category 2. If my friend believes the propositions ($\overline{7}$) through ($\overline{10}$) I consider him color blind, queer, superstitious, and misinformed. If he has a sufficient number of such beliefs, I consider him a menace and insist on his confinement in an institution or at least seek to eliminate his influence in human affairs. But how can I justify my attitude? How am I more right than the bigots of the Middle Ages or the savages, who persecuted people for 'rational' notions that did not tally with theirs?

We need a universal criterion for truth. If such a criterion were recognized by a vast majority of human beings and were proved of survival value, many conflicts between man and man and between man and nature would be resolved. Utterances leading to conflicts could be broken down into propositions about the external world, and the propositions referred to the criteria and evaluated. In fact, if the civilizing process is considered as a conflict-resolving one, this has actually taken place in many instances, but of course not often enough.

It is by no means certain that each assertion and its denial can immediately by inspection be placed into either of the three categories. Even examples given are classified according to the prevailing notions of 1945, that is, in such a way that a majority of the readers of this article will probably agree on the category. Thus almost every one will agree that the question of Vancouver's existence falls into Category 3, but certain quaint people will insist that gremlins have an 'existence' independent of extensional verification. The pair of utterances

(11) 'God exists' ($\overline{11}$) 'God does not exist'

will probably be placed in the second category by people said to be 'tolerant,' while not so long ago it belonged to the first. On the other hand there was a time when the contradiction (2) was clearly in the third category, when the status of a man's slavery was a question of objective investigation of facts and definitions. It must be stressed, then, that at different times different contradictions fall into different categories of verbal conflict.

Now it is evident that conflict will be reduced to a minimum if and only if as many contradictions as possible fall into Categories 2 and 3, and as few as possible into Category 1. In fact, it is possible to make a quantitative definition of civilization in terms of the distribution of contradictions in the three categories, where, while the significance of the second category is not at first clear, the least weight of the first and the greatest weight of the third category can be taken to be the signs of higher civilization. However, this point of view is connected with serious difficulties, as will appear below.

Very probably the beginnings of social life (apart from animalistic family life) began with verbalization of behavior. It became possible for two males to get along when the simple behavior of taking possession of a female (simple reaction to environment) was verbalized into a *symbol* 'This female is mine,' which would produce a semantic reaction in the other male *contrary* to his natural reaction to environment, namely, an inhibition against taking possession of that female. This metamorphosis of the *behavior,* 'This female is mine' into the *proposition,* 'This female is mine' is the beginning of social behavior based on semantic reactions. This process can be roughly described in terms of the historical semantic systems, taboos, magic, religion, philosophy, science. In a way these manifestations indicate a certain shift from the first category of contradictions to the third and in some cases to the second.

One is tempted to assume that any shift from the first to the second and third categories or from the second to the third represents an advance of civilization if civilization is defined by elimination of conflict and a broadening of knowledge. However, the difficulties of this interpretation are many, as was suggested above.

On the basis of this evaluation, it would, for example, have to be concluded that a stratified society with well-defined, legally established castes, including a caste of slaves, is more civilized than a society in which struggles for the abolition of slavery and caste occur, because under the former the question of an individual's status in society would come under Category 3, while in the latter it would come under Category 1. It would also seem that a society based on rigid taboos is more civilized than a society where great freedom of individual behavior prevails, because in the former questions of behavior come under the third category, while in the latter they come under the second. It would also seem that physics in which absolute space and time frameworks are assumed is more advanced than a physics in which they are not assumed, for certain concepts are precisely defined in the former (*i.e.,* simultaneity), while in the latter they depend on the observer, and thus many 'contradictions' involving them come under the second category.

In order to clear up these difficulties, let us examine the steps in the resolution of conflicts.

Contradictions of the first category are either between man and man or between man and nature. An example of struggle

between man and man has been given above in the verbalized behavior, 'This female is mine.' Examples of struggles of man against nature are seen in the verbalizations of behavior such as 'I am hungry,' 'I want shelter,' 'I have a stomach ache,' etc. The change of these declarations into propositions is the first step in resolving conflict. Thus rules can be set up which determine just when a female is 'mine.' If these rules are obeyed, conflicts do not occur. Similarly rules of behavior can be established on the basis of propositions by the process of 'time-binding,' which prescribe the satisfaction of wants, how to obtain food, how to build houses, how to cure stomach aches. Thus the behavior symbol, 'I am hungry' becomes associated with knowledge of the external world expressed in the proposition, 'If soil is cultivated, seeds sown, etc., bread results, which appeases hunger,' or 'If these herbs are eaten, stomach ache ceases.'

Note, however, the vital difference between man-man and man-nature relationships. Investigations based on experience and measured by success of predictions were possible very early in the struggle against nature; but in the case of man-man relationships, the superstructures of semantic relations multiply so rapidly that the notion of 'truth' becomes totally divorced from prediction. But the man-man relationships have also an influence on the man-nature relationships and become intermingled with them. The taboos of social behavior merge with the taboos of demonology, and the fruitful time-binding verbalizations of nature-conquest such as 'If seed is sown, bread will result' are supplemented by or even replaced by a maze of magic with no survival value.

One must keep in mind that an abundance of 'settled' questions does not necessarily mean that conflicts between man and man or man and nature are resolved. Vast civilizations have crumbled and are now crumbling because of reliance on 'settled' questions. In a primitive society the relationship of each man to his neighbor and of each man to nature is fixed by a system of taboos and rules of behavior. But if these taboos and rules are not reducible to *more general* and fewer rules, they must be classified as declarations of behavior (utterances of the first category). For example, 'One must not plant seed, because this involves tilling the soil, and breaking the soil is taboo' is a logical deduction of a 'valid' conclusion and belongs to the third category of utterances, but the major premise 'Breaking the soil is taboo' belongs to the first (irreducible) category, and it is on this level that conflict is bound to arise. Similarly 'You must not undertake public works, because government must not engage in business, because acquisitive competition is always preferable to coöperative effort' is a 'logical' conclusion based on a premise of negative survival value.

According to our proposed criterion for civilizations, a higher civilization constantly strives to reduce the number of its unassailable assumptions, to leave only those most generally acceptable. A tolerant society (with many questions falling into the second category), other things being equal, is more civilized than a rigid one, because all the conflicts in the second category are reducible to a single proposition of the first, 'Differences of compatible behavior are tolerated,' while in a rigid society the patterns of behavior are supported by an involved system of arbitrary assumptions, beliefs and superstitutions of no survival value, potential instigators of conflict and inhibiting factors in the quest for greater knowledge and freedom. Other things being equal, a democratic society is more civilized than a caste society, merely because the funda-

mental postulate of democracy, 'All men are created equal' (a declaration of behavior) is *simpler* than the involved postulates of the caste system and therefore probably more generally acceptable.[1]

It appears further that the problem of survival and elimination of conflict is not solved by simply verbalizing behavior into propositions. Propositions, in order to be tools of survival, must be 'a reflection of reality,' that is they must be 'true,' and this brings us to the conclusion that the elimination of conflict and survival depend on the recognition of 'true propositions.' Only in this way will the substitution of semantic reactions for direct reactions to natural environment have a survival value. The vague sensing of this is probably reflected in the wide preoccupation with 'truth' characteristic of human thought.

We are now ready to restate our quantitative definition of civilization. The highest civilization is a state of affairs in which the maximum number of conflicts between man and man and between man and nature are resolved by verbalizing these conflicts into a series of true propositions, which serve as a guide for behavior. In what follows we attempt to show that the truest proposition (those of greatest survival and conflict-resolving value) are those which rest on the fewest assumptions and from which most predictions are deducible.

[1] The reader is begged not to confuse the *declaration of behavior*, 'All men are equal' (Category 1) with the *proposition*, 'All men are equal' (Category 3). In the Declaration of Independence it is certainly used in the former sense and remains a valuable postulate (Hayakawa's *directive*) for building a conflictless society. Used in the latter sense, it is seen to be simply a false proposition. The two categories are often deliberately confused by many fascists, 'professional Southerners,' etc.

II. *The Criterion of Predictability*

In the name of religion and philosophy men have made steps toward the investigation of truth. Their systems begin generally with dogmas and tacit assumptions. Around these systems of more or less fruitful logic, notions of 'truth' arise. None of the systems has been consistently successful from the point of view of either survival value or resolving conflicts. Only science, especially physical science, has succeeded in building a system of natural knowledge, limited in scope, approximating the ideal indicated above. The method of modern theoretical science, Assumption - Deduction - Conclusion (Prediction) - Verification, has a partial analogue in religion and law, Dogma-Interpretation-Judgment. The reasons for the stratification and inefficiency of religions as bases for elimination of conflict are many; so are the reasons for the sterility of metaphysics and philosophy as methods of securing knowledge and resolving conflicts. But their obvious and prominent shortcoming is the shortcoming of all non-scientific systems, the total lack of a vital scientific measuring stick, the criterion of predictability.

We should like to show that predictability is the *only* yardstick of truth; that on the basis of predictability and universally accepted undefined terms (terms involving structure and order relations only), a positivist conception of the universe *including* man can be gradually approached; that the positivist conception is synonymous with the elimination of conflict and the acquisition of freedom (defined below). We should like to show that the recognition of the criterion of predictability for truth may lead to basic principles of behavior recognized as tending to preserve the greatest harmony between will and reality (sanity) through

the closest adjustment of nervous processes to the structure of the universe.

The introduction of the ethical problem in this connection is not relevant. No one doubts that there exists an optimum range of temperature for the human body, an optimum intensity of reaction of the retina to light waves. It is not too far fetched to assume that there exists an optimum pattern of nervous reactions to the presence of other human organisms, which the old metaphysical apostles dubbed 'Love thy neighbor.' 'Love thy neighbor' has not been very successful as a guide to behavior not because it is 'contrary to human nature,' etc., but *because it has not yet been defined in terms of behavior on the colloidal level.* Ethics has never been effectively geared to other investigations, where predictability could be effectively applied. If this were done, it might seem possible to develop a 'general ethics,' of which the ethics of various cultures would appear as special cases and would become amenable to evaluation in terms of survival value. It can perhaps be shown that 'virtue' as a social behavior within a certain social framework depends on nervous reactions not much different from those of good digestion or from favorable reactions to the sound of a major triad.

Happiness, which a hero of *War and Peace* defines negatively as the 'absence of illness and remorse,' may constantly approach more precise definitions as the physical, colloidal nature of both illness and remorse become known. Social science may then become a study of conditions which will guarantee this state to a maximum number of individuals. It will merge with medical science, simply dividing with the latter the spheres of influence.

Present day anthropology in its quest for 'objectivity' and as a reaction to earlier naive, self-centered views of the Occident, often falls into the other extreme, namely, that of complete relativity of *all* values, in effect a denial of the existence or the possibility of existence of general human criteria of evaluation. Following Spengler's cue, it often denies the existence of any general evolutionary principle of culture, allowing only the evolution of *cultures,* destined to go through incipient stages, maturity, old age, and death.

Present-day philosophy of science, frightened by the wreck of Euclidean, Newtonian, and Aristotelian frameworks of thought, falls into what seems a sophisticated pessimism and speaks of the 'impossibility of complete knowledge.' It wistfully looks to 'Ultimate Reality' (which no one has ever expressed in operational terms) as on a promised land forbidden. We suggest the abandonment of God-seeking. We suggest a steady and infinite approach to reality measured *quantitatively* where more knowledge means more predictability with less assumptions. In the fields of ethics and social sciences our goal is a description of 'happiness' and 'virtue' in operational terms. Such a description of 'freedom' will be attempted here. It involves the criterion of predictability.

The criterion of predictability is possibly as old as language. Its conscious and systematic application, however, is a recent thing. The older concepts are the undefined and static terms, 'Truth' and 'Reality.' But the history of human thought has often been a monstrous growth of hopelessly involved networks of propositions, completely divorced from what we today would call 'reality.' To the Greeks a true proposition was a verbalism derived by certain rules from other verbalisms accepted as 'self-evident.' Euclidean geometry was the most glorious achievement of Greek thought. Fran-

cis Bacon declared the supreme criterion for truth to be experiment. All progress in the search for truth consisted of refinement of experimental methods, broadening the range of experimental activity and developing a language of deduction —mathematics. Experiment and mathematical deduction, supplementing each other, constitute the chief tools of scientific research. This method may be said to be founded on the criterion of predictability. Our purpose is to show that not only the natural sciences but all meaningful knowledge is based on this criterion and to tie up this assertion with the definition of civilization given above, now restated in quantitative terms:

The highest civilization is a state of affairs among human beings where a minimum of conflict, a maximum of freedom, and a maximum of knowledge prevail.

Conflict has been defined above. Freedom (more fully discussed below) means maximum predictability of one's own behavior. Knowledge means maximum predictability with minimum assumptions about the external world. In this connection we shall show that:

1. Mathematics, the most positivist of sciences and the most effective (contradiction-proof) of languages, bases the truth of its propositions entirely on the principle of predictability.
2. The hidden contradictions of ancient dilemmas are easily laid bare by the applications of this criterion.
3. The criterion is semantically significant as a tool of dialectics.
4. It has possible applications to the social sciences.
5. It is intimately connected with the notion of 'freedom.'
6. It is connected with the notion of 'reality.'

The method used will be the translation of *all* meaningful propositions into a language of verifiable predictions. When prediction is unconsciously incorporated into meaning, its importance will be stressed. A proposition will be defined 'true' (a quantitative term), 'false,' or 'meaningless' according to whether it can be stated as a set of predictions which are realized (the extent of realization is the measure of truth), or a set of predictions which are not realized, or whether it cannot be stated as a set of predictions.

Our first object of analysis is mathematical truth.

III. *Mathematical Truth and Its Physical Counterpart*

The preciseness of mathematical propositions becomes evident through the realization of three of their characteristics:

1. Mathematical notions are defined and propositions deduced from the undefinables and postulates of the particular system in a *finite* number of steps.
2. The Law of Excluded Middle is applicable to mathematical reasoning.
3. Each mathematical proposition is immediately, obviously, and uniquely translatable into a prediction, in fact, is equivalent to one.

These conditions we shall define as the conditions of *positivism*. All knowledge will be evaluated in terms of its approximate satisfaction of these conditions.

As an example of positivist knowledge, we shall examine an elementary discipline of mathematics, say euclidean geometry. The first condition of positivism is obviously satisfied by the propositions of this discipline with the exception of the propositions involving incommensurables and limits. To establish these, higher disciplines of infinitesimal analysis are invoked, that is, the postulates not ordi-

narily among those of euclidean geometry are added. The second condition is involved in the very method of proof. The third condition is not quite so obvious. What do these propositions predict? The answer is that they predict phenomena which take place inside our skins. The only fruitful meaning of these propositions is contained in predictions of the following type: 'If you assume these postulates and follow rules of reasoning (which also must be stated) you will inevitably come to the conclusion stated in the theorem.'

To show the significance of this explicit restatement of mathematical propositions, let us examine the confusion which is so often associated with mathematics. The difficulties of high school and college students are well known, but confusion is not confined to them. The balking attitude of the ancients toward infinity and infinite processes is reflected in present-day attitudes of the 'intuitionists.' There are still people who say that the real number system is 'meaningless.' The superstitious fear of 'imaginaries' is only half-heartedly disspelled by most teachers of mathematics. In my own student days I also gazed at the equation

$$e^{\pi i} = -1 \qquad (12)$$

and suspected it of being a gigantic hoax. My doubts were about the *existence* of such operations. Their reality becomes clear only through the realization of their content, which is nothing more than, 'If you assume such and such and follow certain rules of reasoning, you will conclude this and that.'

The study of mathematics, however, began as a natural science, not a 'psychological' one. To this day many people assume the propositions of mathematics to be propositions about the external world, for example about physical space, when as a matter of fact, an additional assertion is needed to connect the two, such as 'The structure of the universe is reflected in the structure of mathematical thought.' The omission of this assertion leads to confusion. The Greeks, instead of generalizing their mathematical thought to include mathematical analysis, gave up in despair, when they saw that their 'mathematical reasoning' did not tally with the physical situation. In other words they did not evaluate the power of their mathematics by the potentiality of predictability embodied in it. One of the best illustrations of this impotence of the Greeks is the Achilles Paradox,[2] a situation in which the structure of the universe is *not* reflected in Greek mathematics, devoid of infinite processes. Stated as a prediction, Zeno's contention becomes:

(13) Achilles will never pass the Tortoise.

The first step is to realize that this prediction can be on either of two levels, which the ambiguity of ordinary language does not disclose. Namely, it can be a prediction of an external phenomenon, *i.e.*, one about a physical Achilles racing a physical Tortoise, not overtaking it in any specified time.[3] To refute

[2] Although most readers are probably familiar with this fable, we restate it for the sake of completeness. Zeno says that Achilles, running ten times as fast as the Tortoise, who has a head start of say 100 yards, cannot pass it, because by the time Achilles will have run the 100 yards, the Tortoise will have advanced 10; by the time Achilles will have run 10, the Tortoise will have advanced 1, etc., *ad infinitum*.

[3] Mathematicians please note that every mathematical notion involving an infinite process (explicitly or implicitly) contains a prediction. In this case 'never' means, 'Name an instant, and I shall show that the event has not taken place.' Obviously that is not the sense in which Zeno uses 'never.' Compare also the 'epsilon' definitions of analysis. 'For every epsilon greater than zero there exists a delta such that, etc.,' can be restated as 'Name an epsilon, and I shall exhibit a delta.' The crucial

this prediction, one need only perform this or an equivalent experiment. To many 'practical' (read unimaginative) people, this is the end of the paradox. But there is also another interpretation of the prediction, namely, as a prediction on the logical (mathematical or psychological) level. The prediction does not at all concern Achilles. It concerns events which will take place *inside your skin, i.e.,* it maintains that *if* you start with assumptions as stated *and* follow reasoning as prescribed, then you will come to the predicted conclusion. What of it? The sophist stated the assumptions; *he* set down the rules of reasoning which we must follow (*i.e.,* examine the relative positions of the two contestants at moments specified by *him*); and then *he* interprets the result into the conclusion 'Achilles will never pass the Tortoise.' The surest way to refute the significance of the paradox is to accept the conclusion as determined by the sophist's method, but to remind him that the conclusion is simply on the 'logical' level, where the logic is the sophist's, not ours, and that if it does not tally with the physical phenomenon, it simply means that the sophist's 'rules of reasoning' lead to predictions on the logical level which do not tally with phenomena on the physical level, *i.e.,* the structure of *his* logic does not correspond to the structure of the physical world.

'But is there a better logic?' asks the sophist.

There certainly is. In that better logic, which *does* tally with physics (at least in this experiment), it is not true that an infinite number of finite intervals necessarily add up to an infinite interval, as the sophist tacitly assumes. It becomes clear that the infinite sequence of moments examined by the sophist all lie within a finite interval of time (the time it takes for Achilles to travel 111⅑ yards (see footnote). In that more accurate logic the prediction 'Achilles will not pass the Tortoise' becomes 'Achilles will not pass the Tortoise within the interval of time examined, *i.e.,* the time Achilles needs to run 111⅑ yards,' and this prediction *does* tally with the physical situation.

It is seldom emphasized that the predictions of mathematics are not predictions about the external world but about events inside our skins. In grade schools (even in high schools) theorems are often 'demonstrated' to youngsters by measurement. It may be that these are sound pedagogic methods as far as they go. It may be that the immature mind is unable to grasp or is indifferent to 'abstraction' (we mean, of course, abstraction of higher orders). But it may also not be true. And if it is not, then tremendous amounts of nervous energy are wasted in establishing connections *tacitly* between mathematics and the external world (two different levels of abstraction) which later preclude fruitful developments along the lines of abstract thought, namely, the study of mathematics, because paths that are struck in that direction are obstructed by special applications on lower levels. What efforts are needed later to induce students to think in terms of imaginaries, which 'contradict the laws of algebra' (it has been drilled into them that 'you can't take the square root of a negative number'), to think of the calculus without geometric crutches, to develop the habit of conscious abstraction and generalization, the essence of all rational thought!

The connection between a mathematical proposition of, say, euclidean geometry and its physical counterpart is not

importance of naming certain quantities *first* becomes apparent in uniform continuity, uniform convergence, and other refined notions of modern analysis.

an obvious thing. It must be established by a proposition involving another prediction, connecting the structure of one with that of the other, *eg*, 'The space in which we live has to the extent of ordinary measurements, euclidean properties, where straight lines are defined by paths along which light travels.' This proposition is not at all a proposition of mathematics. It is a proposition of physics and involves predictions about the external world, which may be verified to certain degrees of accuracy. In particular the measurement of the sides of a physical 'right triangle' would be a verification of a prediction contained in one of the theorems about such triangles. The definition of a physical 'straight line' is certainly needed. In our measurements we always tacitly use a criterion for 'straight line,' the path of a beam of light or a line of force of the earth's gravitational field or some similar thing, which we agree to call a straight line. The question whether it is 'really' a straight line has no meaning whatsoever.

In the realm of physics we find that knowledge which comes closest to satisfying the conditions of positivism is knowledge expressible by mathematical language. This means that the ultimate verification of the predictions rests on measurements of quantities, which, it is thought, are all reducible to the fundamental undefinables (space-time and matter-energy). The aim of positivist philosophy of science is the establishment of methods by which it will eventually become possible to reduce all knowledge to such measurements. The trend of all rapidly progressing sciences has certainly been in that direction. It becomes more and more evident that all 'qualitative language' is a temporary framework in which situations are given names to be used in manipulating them until their quantitative structure is discovered. The establishment of the strictly quantitative structure of such seemingly 'qualitative' experiences as pitch and color are early classical examples of this tendency. The creation of modern mechanics, which has completely replaced the mystic 'tendencies,' 'wills,' and 'affinities' of matter characteristic of the metaphysical approach, is another example. Another is the chemistry of the nineteenth century, which reduced the descriptions of compounds to strict quantitative relations between elements. Another is sub-atomic physics, which did away with the qualitative differences between the 'elements' and substituted for them purely structural formulations.

The triumphs of quantitative analysis are not confined to the physical sciences. By means of powerful statistical methods and recognition of fractional predictability (mathematics of probability), human affairs *en masse* are likewise described and predicted. Developed in its applications to the social sciences, statistical probability now returns to physical science to explore the sub-atomic reality. To what is this unmistakable success of quantitative methods to be attributed? To answer this question is to examine how the criterion of predictability operates in resolving contradictions of judgment.

Whenever such a contradiction arises, and both parties desire to come to the same conclusion, the invariable procedure is to appeal to 'proof,' that is, to make (tacitly or explicitly) predictions based on each judgment, where it is agreed that the realization of a particular prediction is equivalent to the vindication of the judgment on which it is based. But it is important that both parties agree on what shall constitute proof. We shall analyze some trivial examples.

I maintain that one of two pencils is red, the other green, and my color blind friend maintains that both are grey. If

my friend is aware of his affliction, the authority of a third disinterested party will determine the issue, or, if he believes that I am disinterested, he will take my word for it. My friend may be a physicist and willing to test the color of the pencils by a spectroscope. At any rate, to agree, my friend and I must find a common ground on which we can make our predictions. Let us examine other cases.

How can I prove the existence of Vancouver, where neither my friend nor I have been? I can appeal to the authority of maps, to the authority of newspapers, to the authority of other men, or to the senses of my friend if he is willing to take the trip. But are such authorities always reliable criteria? I probably appear very unreasonable to the fundamentalist preacher who quotes 'authorities' on the six-day creation, and to the New Guinea native, who quotes equally unimpeachable 'authorities' on sorcerers. The appeal to the senses is by no means adequate. It is not appeal to the senses that established the heliocentric description of the solar system. On the contrary, it was the breaking of bonds imposed by the senses. If we establish the existence of microbes by appeal to the senses (refined) and refute the existence of gremlins by the same appeal, what can we say about the existence of atoms?

The question arises, does there exist a universal yardstick, a language of experience common to all human beings, so general that those to whom it does not apply may be termed insane and their influence justifiably eliminated? Does there exist a criterion so basic that if predictions made in terms of it are realized, the truth of the proposition on which the predictions are based is immediately established?

The search for such universal criteria has gone on for a long time. The invocations of the 'Word of God,' declarations *ex cathedra,* and philosophical systems are attempts to establish such criteria. The homely maxim 'seeing is believing' is a rough statement about the conclusiveness of experimental evidence. However, it is far too uncertain. What is seeing? How about illusions and hallucinations? How about the vast realm of the invisible on which the modern notion of the universe is built? An appeal to the senses is certainly a first approximation in the search for reality, but we must go far beyond. The mechanics of the senses must itself be analyzed and vast networks of valid inference established. A chain of truths must be sought, backing each proposition about the external world, each truth being on a more fundamental, more general level than the preceding. An 'appeal to the senses' is only a link in that chain. What then is the last link? What are the undefinables of the system?

At least one such category of universal judgment is known to exist, the category of *order and structure.* To all humans 3 is more than 2. In the configuration A-B-C, B is *between* A and C. These notions are crude and subject to infinite refinement, but no refinement disturbs the *order* of the elements once established. Superstructures of measurements other than space come next: stronger-weaker, lighter-darker; louder-softer, where 'measurement' means the reduction of inaccurate 'subjective' perceptions to abstract quantities involving *order* and *structure* only. Multidimensional measurements, structure relations based on systems other than the real number system, such as the complex number field, matrix algebra, etc., flow logically out of the development of the language based on structure alone (mathematics). These are the undefinables on which every

meaningful prediction must be based. Obviously, it is not possible at the present time to reduce all knowledge to positivist utterances. Our present state of knowledge is a vast collection of suppositions, rules of thumb, working hypotheses, beliefs. We rely heavily on authority, because certainly verification in all or even in a significant number of cases is impossible. But a firm establishment of the fundamentals as attempted here is necessary to establish or to refute authority.

The greatest contribution of the West to humanity is science, the critical approach, the extensional investigation. Anthropology has shown us that our *mores* are as much infested with shibboleths of doubtful or negative survival value as those of many primitive societies. We must obviously reject the trader and missionary approach to the pre-literate society, which confined the 'civilizing process' to endowing the latter with shotguns, syphilis, and arbitrary taboos on his sex behavior based on Christian word-magic superimposed on his home-grown kind. Anthropologists, constantly confronted in their field work with tragedies of this type, are inclined to negate any 'absolute' standards in the evaluation of civilization and especially of ethics. This reaction is understandable considering the failure of applying 'our' standards to other cultures. Yet there is no reason why *general* standards cannot be found by which *both* our culture and other cultures could be evaluated. These standards have already been suggested in the existing literature of general semantics. According to them we evaluate our western science as having genuine survival value. Science can probably be safely 'sold' to every human being, properly approached. We must therefore firmly establish our 'authorities' based on the scientific approach. We must show why the contention of the physician is more reliable than that of the medicine man; the statement of the biologist more reliable than that of a fundamentalist preacher; the theories of Franz Boas truer than those of Alfred Rosenberg. To test the reliability of authorities, criteria of knowledge must be universally established.

We have maintained above that the criterion of predictability is synonymous with the criterion of truth, and this leads to a definition of reality in these terms. The problem of establishing this, however, is vast. It involves the entire task of semantics, *i.e.*, that of clearly establishing abstraction levels in all reasoning, judgment, investigation, and discourse.

The task of education becomes a thorough conditioning of the human nervous system to permit it to establish habits only in accordance with *this* rationality, to reject any authority except that based on rational investigations, and, above all, to recognize and to resist the irrational actively and uncompromisingly (as 'rational and 'irrational' are here employed). The aim is the establishment of a new materialism and a new dialectics, more powerful than the old, a materialism which instead of minimizing the importance of that which is called the 'spiritual,' brings it within the sphere of its investigations by intimately linking psychology and physiology, physiology with biochemistry and biophysics, which in turn rest on operational positivist foundations. The answer to persistent believers in the 'supernatural' (there are surprisingly many of them among scientists) is that the 'supernatural' is a self-contradiction, because everything that happens is extensionally defined as the 'natural.' Similarly the postulation of the existence of 'unknowables' is simply a declaration of behavior that inhibits the search for

truth (greater predictability). The unknown should be regarded only as the 'not yet known,' while the 'unknowable' simply becomes meaningless.

IV. *Predictability and Freedom*

So far we have attempted to establish a quantitative description of civilization and have pointed out that 'truth seeking,' *i.e.*, investigation of criteria for true propositions (conflict resolving) is a vital activity in the civilizing process. Not the least important result of establishing such criteria is the abandonment of meaningless verbalisms, which for lack of an effective critique of meaning were thought to be unsolvable dilemmas. We have already exploded the Achilles paradox by applying the criterion of predictability. We wish to examine in this light one of the most significant of the old dilemmas, the so-called 'free will vs. determinism' controversy. As a preliminary study, we shall take up the well known barber paradox, which provoked modern thinkers to doubt the validity of 'propositions about all propositions' and has had reverberations in the recent critique of the foundations of mathematics. The paradox rests on a statement made about every inhabitant of a village:

(14) 'The barber shaves all those and only those who do not shave themselves.'

This statement supposedly determines the shaving habits of each inhabitant. The shaving habits of the barber as a particular inhabitant must then be inferred. But both the statements,

(15) 'The barber shaves himself,' and

($\overline{15}$) 'The barber does not shave himself.'

are incompatible with (14). This seems to destroy the 'law of excluded middle' and the syllogistic process of inferring the particular from the general.

The paradox becomes perfectly transparent when the proposition (14) is stated as a prediction, the veracity of the inhabitants being explicitly assumed. The prediction is about the result of a poll taken among the villagers. If every villager is asked to fill out a questionnaire consisting of two questions,

(16) 'Do you shave yourself?' and

(17) 'Does the barber shave you?'

then (14) is equivalent to the prediction,

(18) 'In every ballot "Aye" to one of the questions will be accompanied by "Nay" to the other.'

Now 'every' ballot means Jones' ballot and Smith's ballot, and . . . . the barber's ballot. But to the barber (16) and (17) are equivalent. Therefore he must answer 'Aye' and 'Nay' to both, if he is telling the truth as assumed. Therefore prediction (18) cannot be realized.

The technique of propositional functions, of course, resolves the paradox with equal success. The object here is simply to present semantic analysis in slightly different terminology linked with the predictability criterion of science, and which in other situations may prove simpler and more immediately applicable to experience. The challenge to the dilemmas of metaphysics, to babbling politicians, advertisers, advocates of White Supremacy, and other savages should be 'make a realizable prediction' instead of a vague 'prove it' or 'define your terms,' because the latter are simply invitations to more babbling.

The serious paradox which concerns us here is the old one about 'free will *vs.* determinism,' a favorite of theology but prominent in modern philosophy of science.

The question was usually blandly stated as 'Is there such a thing as Free Will or is every phenomenon including the actions of every individual predetermined?'

In idle verbal arguments, the exponents

of determinism are always able to establish an 'irrefutable case.' In answer to contentions such as 'I raise my arm by free will, because it is in accordance with my intention,' they are always ready to reply, 'But your intention is also phenomenon and was determined by a previous cause.' This, of course, contradicts the 'intuitive' feeling of free will ('But I can *choose* either to move or not to move my arm'), which in turn is countered by 'But your choice is again "determined," ' *etc., ad nauseam.*

The question has meaning only if predictions are made based on each contention. We find that predictions about 'free will' and 'determinism' are *predictions about predictions.*

What do we mean when we say that the stone is not free in its flight, but the bird is free—or at least, is more free than the stone? As far as we can analyze these judgments, we see that we are comparing simply the degrees of predictability concerning the behavior of the stone and the bird. In comparing the 'freedom' of any two individuals (entities whose behavior as a whole is studied), three bodies are involved, the two bodies compared *and the investigator, who makes the predictions.* From such a standpoint freedom can be quantitatively defined.

Let us now return to the bird and the stone. The observer, studying the habits of each, can now significantly say that the bird is more free than the stone. There is a wide range of conditions under which the behavior of the stone can be predicted. It can be placed in a situation where the forces acting on it are known, and its motion can then be predicted. The effects of temperature and pressure can be predicted, etc. The behavior of the bird can also be predicted, but far less precisely. Innumerable details of the bird's behavior cannot (1945) be predicted, such as whether it will turn its head, take off, chirp, etc. Suppose now that another observer knows more about birds than about stones. Does that mean that 'to him' the stone is more free? The question immediately arises about the 'real' degree of freedom of bird and stone. Again there is a quantitative definition of 'reality.' Judgments based on greater reality are judgments based on greater predictability. If the knowledge of the two observers is *combined,* greater predictability of the behavior of both the stone and the bird results. Comparative freedom of bird and stone determined by this greater knowledge is then more 'real.' 'Ultimate reality' can only mean judgments based on 'complete' predictability, a limiting concept.

What then is the degree of freedom of man? It is measured in terms of the predictability of his behavior and always involves an observer. The confusion arising from this question arises from the formulation 'Am *I* free?' Here both the object and the observer are taken to be identical. Actually the situation is very similar to that in the barber paradox. The latter is clarified by the recognition of the fact that whereas to every one else in the village the two propositions 'I shave myself' and 'The barber shaves me' are incompatible, to the barber they are identical. Similarly the statement 'I can predict *your* behavior' is to me equivalent to 'You are not free,' while 'I can predict *my* behavior' is equivalent to 'I am free.' A prediction of behavior is connected with the notion of 'I will,' or control. I can say 'This stone will now describe a parabolic arc' and then throw it. I have certainly proved that the stone is not free in this respect. But have I also shown that *I* am not free, since I have to a certain extent predicted my own behavior? If this point of view is assumed, the whole argument about free will becomes devoid of content, especially since it is

shorn of its emotional connotations, which gives it its vital historic significance. To say 'I shall do so' and do it demonstrates what people always have called 'freedom.' There is no reason why these connotations should not be kept. But their clarification involves a definition of freedom in terms of predictability. When the observer and the observed are different, greater predictability means less freedom; when they are 'identical,' greater predictability means greater freedom.

Let us examine the process of self-predictability further. Let us suppose that by a tremendously developed technique of observation, it becomes possible to predict the behavior of an organism completely. To be specific, let us imagine an apparatus into which the observed organism is placed and which projects the immediate future behavior of the organism on a screen—a fortune-telling machine. Fantastic as it seems, there appears no logical impossibility for the existence of such a machine. Let us now suppose that our illustrious scientist, the inventor, decides to perform an awesome experiment on himself, and he sees that he is 'destined' to commit murder or to be killed in an accident or to be involved in something equally unpleasant, a favorite and gruesome theme of romantic fiction. The fantasy immediately involves the old arguments about 'fate,' etc. The whole notion is immediately exploded when it is realized that self-observation in the ultimate sense of the word is impossible. I can contemplate my hand or my navel, but not my 'self.' In the statement 'I contemplate myself,' 'myself' can never be identical with 'I' (Korzybski's non-identity). The question 'What am I thinking of?' can have only a trivial answer 'I am thinking, "What am I thinking of?" ' The story of the well-known absentminded professor illustrates this point. Deciding to overcome his handicap, the professor wrote down the whereabouts of his things when he retired. Upon rising he was gratified to find everything at hand. 'The clothes are in the closet,' he read, 'the shoes are under the bed; that watch is on the mantelpiece. Quite correct. But where am I? The last entry is "I am in bed," but the bed is empty!'

The recognition of the fact that 'self-observation' is impossible at once dispels the dilemma of 'fate.' Predictions about one's 'self' are not based on 'observation' in the sense that the predictions about the stone are. Therefore there is no such thing as inevitability of one's own behavior except where the knowledge (predictability) of this behavior is absent. It follows that *the ability to predict one's own behavior is equivalent to freedom, in fact, is the only content of freedom.*

The range of such predictions is of course decisive in determining the degree of freedom. This tallies with the popular notions. If Smith is in jail, he is to a certain extent not free, because the prediction 'I shall go to Vancouver' is unrealizable for Smith in a Chicago jail. It may seem at first thought that Smith in jail can predict more about himself than Smith out of jail, because of routines, etc. But in considering Smith's freedom we must consider also the *range* of predictions realizable for Smith, in other words, the range of his activities, the repertoire of his attainable desires, etc.

If Smith has learned to predict the behavior of Jones, Jones is not free relative to Smith. But if Jones is *also* able to acquire this knowledge about himself, then he becomes free, and Smith's knowledge of Jones' next move is again restricted. As an example, let us suppose that Smith has placed Jones into our prediction machine and finds that Jones is 'destined' to

raise his arm. If Smith is silent about it, *i.e.*, if knowledge is denied to Jones, it is conceivable that Jones' raising his arm is 'inevitable.' But if this knowledge is imparted to Jones, Jones immediately acquires the freedom not to raise his arm. This example finds its counterpart in psychoanalysis, which strives to impart to Jones knowledge about Jones accessible to the physician but not to Jones.

The progressive study of nature by man constantly reveals nature to be less and less free[4] (unpredictable). But the study of a man by himself on the contrary reveals (makes) him more and more free (self-predictable). Resolution of conflict between man and man through the increase of total individual freedom (self-knowledge) possessed by mankind, and between man and nature through the subjugation of nature to man is the object of collective existence. In this light we define civilization.

The seemingly insoluble difficulty in the 'free will *vs.* determinism' problem lay in the tacit assumption of the existence of an *observer* relative to whom man's freedom was considered. Since there is not the slightest evidence of such an observer, he must go the way of the 'supports' on which the earth was presumed to rest, the First Cause, the Ether, and similar semantic disturbances. In fact the verb 'exist' is meaningless when applied to things about which no predictions can be made. Many unconsciously assumed the role of that 'observer.' He was then talking in terms of self-observation and got entangled in a monster barber paradox. The tacit assumption of an 'observer' will appear again in the last context in which we shall examine predictability, namely, in connection with 'reality.'

[4] See the comment on 'unpredictability in modern physics' in the Resumé.

V. *Predictability and Reality*

Sir James Jeans in a recent book tells a gloomy parable. Somewhere a man who has no contact with the civilized world except a radio listens to signals given out by ships at sea, giving their name and position. The hermit records these coördinates and after years (or centuries) of such recording begins to build theories. His theories are both mathematical and empirical. For example he hears regular successions of pairs of coördinates and on the basis of their regular recurrence builds his mathematical theories. He will never record a longitude greater than 180, nor a latitude greater than 90 in absolute value. Furthermore, he will tend to hear more rapid changes of longitude at higher latitudes. Now this man begins to construct a mathematics, in which no number is greater than 180 in absolute value. He may make certain assumptions about space, time, and derive rules for handling the complex notions derived from these. He may discover a 'law of nature' which 'makes' the ships travel faster in the east-west direction at high altitudes. Later he may develop a 'theory of relativity,' where by assuming a curvature of his space, he can dispense with this 'law of nature.' Each successive development of his theories will enable him to predict more and more accurately the position of each ship, or, to be more exact, the *signal* which he will receive at the time $t + \triangle t$ after having received a certain signal at the instant t.

'But,' implies Sir James Jeans, 'do these predictions, no matter how accurate, enable our physicist to know what a ship *is* and why they should travel at all?'

The picture seems tragic, because it denies this presumably knowledge-loving observer the knowledge of very interesting objects, namely ships, and the very interesting world in which ships are built

and sent on journeys. But in fact a tacit assumption is made that such knowledge *could* be available to him, if, say, he came in contact with the world.

This fable has an obvious connection with questions of 'ultimate reality,' which are still confronting some outstanding scientific philosophers, particularly those who saw the world of Newton crumble and fall about them, which must have been a painful experience for people not conditioned to the view that the collapse of man-made universes is a normal, harmless, in fact, a desirable occurrence in the progress of knowledge. The wistful statement is often made that man is doomed to ignorance of the world except for insignificant peeps, because his nervous system is so constructed that he is unable to grasp 'ultimate reality.' The isolated observer's 'knowledge' of the ships is indeed pitiful. A whim of the skipper, whose existence our physicist does not even suspect, will shatter all his painstaking calculations. However, even as I write these lines, I write them from the point of view of one who has seen ships and met skippers, and this is also the point of view of Sir James Jeans. If an analogy is to be permitted between our signal collector and the modern physicist, who presumably records nothing more significant than signals coming from 'ultimate reality,' then necessarily a tacit assumption is made that a point of view *exists,* from which both the physicist and that 'ultimate reality' are visible, and from which it can be seen that the 'ultimate reality' is hidden from the physicist forever because of his limitation.

We deal here with purely metaphysical existence, *i.e.,* an 'existence' which means absolutely nothing, as the 'existence' of Newton's 'Absolute Space' or the 'existence' of 'ether.' It means nothing because it is impossible to verify, that is, it is impossible to *make a prediction* concerning it. I stress especially the sense in which 'impossible to make a prediction' is used here: it is used in such a way as to be synonymous with 'meaningless.' It is not used in the sense of 'physically impossible to verify,' as for example it is at present (1945) impossible to verify whether there are planets around Arcturus. This latter 'impossibility' is not intrinsic in the question, because it is conceivable (1945) that next year or next century telescopes or other means can be derived which will make it possible to determine the existence of such planets. By verification which makes a proposition meaningful I mean potential verification, *i.e.,* the possibility of making meaningful (1945) predictions. Once more it is stressed that no meaningful (1945) prediction can be made about 'ultimate reality' nor about an 'intelligence' to whom alone this 'ultimate reality' is discernible.

When philosophers speak of 'unknowable' reality, they mean 'knowable but not by us.' This unconscious assumption is expressed in analogies similar to the above. This in turn implies the existence of a recipient of knowledge of whom we know and can know nothing. But this again brings up the same ambiguity on a different level, because this 'undiscoverable recipient' if mentioned at all means 'discoverable but not by us.' The chain has no end.

Unknowable reality is as barren as any metaphysical ghost which contains a contradiction in its very definition: 'immovable objects,' 'infinite forces,' 'omnipotent beings' (can such a being create a stone which it cannot lift?). All of these are products of semantic disturbances. But let the rejection of the 'unknowable' never be construed as a vulgar point of view which denies the meaning of everything not in the range of immediate comprehension. On the contrary, the rejection of the unknowable brings vast undiscov-

ered worlds into the realm of the knowable. Allowances should be made for total revisions of verbal structures and methods. No meaningful question should escape investigation. No conclusion should escape doubt. No shibboleth should be held sacred except the one just stated. In the last analysis mankind *must* set up undefinables and unassailables, forming the foundation of its collective striving. Some of them, although not yet clearly formulated, are now being established or rather defended by force of arms. The object is to keep them *as few and as general as possible*. In this principle lies the answer to the dilemma of tolerance and democracy in its dealing with intolerance and demagogy. Does the principle of tolerance proclaim the tolerance of intolerance? It most certainly does not. Intolerance$_2$ of intolerance$_1$ *is not* intolerance$_1$. Hatred$_2$ of hatred$_1$ is not hatred$_1$. Similarly the establishment of a universal criterion of knowledge which is *operationally* equivalent to the destruction of shibboleths, is not a shibboleth.

Resumé

The first step toward the resolution of conflicts associated with incompatible behavior is the verbalization of behavior.

Primitive verbalizations are 'declarations of behavior.' If they are propositions at all, they are propositions about the inner state of the speaker, not about the external world.

Verbalizations become propositions, *i.e.*, statements about observable reality[5] when they tacitly or explicitly contain a prediction, the verification or the refutation of which establishes the truth of the proposition.

Contradiction of propositions can be resolved if the predictions they contain concern experiences common to both parties concerned.

One of the objects of general semantics is or should be the search for ultimately primitive experience common to all men and having the intrinsic structure similar to the structure of the universe.

It is hoped that such experience exists and can be made the foundation of a language whose structure is similar to the structure of the universe, *i.e.*, that such a language will enable men to predict all phenomena of nature of which man is a part (positivism).

The significance of 'unpredictability' in modern physics does not make meaningless the search for more and more generalized knowledge, because a clear realization of the 'unpredictable' is also knowledge. What is unpredictable individually becomes predictable *en masse*. Fractional predictability (probability) is a useful generalization. Moreover 'unpredictability' should be dated. Even if we discover that macroscopic predictability is composed of submicroscopic 'uncertainty,' it does not preclude some future more refined methods of both observation and reasoning, which will establish a higher level of predictability for the individual particles.

Predictability becomes freedom of the predictor and lack of freedom of that whose behavior is predicted.

Predictability is the sole content and criterion of knowledge (a definition of knowledge in operational terms).

Knowledge (predictability of the external world) and freedom (self-predictability) are the goal of collective

[5] At some future date it may become possible to observe directly the inner state of affairs of an individual. At present, for example, the state of hunger of an individual can be roughly established by observing the contents of his stomach. Similarly the presence or absence of 'mental' and 'emotional' processes may some day be likewise established. At that time statements about the inner state will become propositions about observable reality, subject to prediction and verification.

existence. Elimination of conflict through the establishment of very few and very general universals serves to channelize the efforts of humanity toward these ends.

ACKNOWLEDGMENTS AND GLOSSARY

The basic formulations of this article were inspired by the works of Alfred Korzybski and S. I. Hayakawa. This should be evident to any one familiar with them. A great deal of the terminology is taken bodily out of Korzybski's *Science and Sanity*. Specific credit is not given in footnotes, because the author considers both the formulations and the terminology as firmly established in general semantics. However, as a precaution against possible misinterpretation, a glossary of the terms is appended. Perhaps in some cases the author deviates from other writers in the field in the use of these words. Some may have somewhat more specific, some more general, meanings than those originally associated with them. The meanings indicated here are those of the terms as used in the context of this article. They should not be regarded in the sense of dictionary definitions but as the author's attempts to indicate extensionalization of the terms set forth here.

Behavior: Any discernible change of state of an object, particularly of an organism, *e.g.*, motion, digestion, change in temperature, etc. It is assumed here that more and more processes of life will eventually be described and explained in terms of behavior only. It is thought that the relative lack of success of the behaviorist school of psychology was due chiefly to the failure to discover the significance of behavior on the colloidal level.

Civilization: Defined in the article.

Colloidal level: Phenomena involving 'sensations,' 'consciousness,' 'emotional states,' and other more or less metaphysical notions are held to be changes of state in the colloidal structure of cells. It is hoped that such changes will eventually be discovered and minutely studied.

Elementalistic: Based on a false belief that various aspects of the same phenomenon are or can be completely separated. In alchemy a 'substance' was believed to exist independently of its 'properties'; in theology a 'soul' was believed to exist independently of the 'body,' in Newtonian physics time was believed to exist independently of space, etc.

Ethics: An attempt to evaluate human behavior, in particular behavior involving relations between humans, in terms of general principles stated in advance.

Freedom: Defined in the article.

Knowledge: Defined in the article.

Magic: A semantic disturbance in which certain patterns of behavior are associated with certain wish reactions in such a way that the performance of the former is believed to be accompanied by the fulfillment of the latter, *e.g.*, prayer about the occurrence of external events.

Metaphysics: A system of inquiry aimed at the discovery of 'ultimate reality.' Its goals, assumptions, undefinables, and methods were never clearly stated. It consisted largely of manipulations of words, confusing grammatical structure with the structure of 'reality' which it sought. Its questions often began with 'What is . . . .?' where the answer simply equated two sets of terms. It is assumed in this article that since these 'equations' provided no increase of predictability, the total value of metaphysics was at most zero. However, viewed in its historical perspective, it must be considered as a step in the development of the faculty of fruitful inquiry. Whether it did more harm than good is an open question.

Multi-ordinal terms: Those whose meaning changes with the level on which they are considered. In this article a technique is suggested for establishing the level of meaning by means of specific predictions. A very important multi-ordinal term is 'exist.' For example, the existence of women truck drivers can be established by the prediction, 'You will see a woman who drives a truck' To prove the existence of witches on the *same level* of existence, a similar operational prediction must be made (*cf.* 'reality').

Non-elementalistic: (Cf. 'elementalistic') Applied to formulations which consider phenomena as a whole, *e.g.,* in modern chemistry 'properties' and 'substance' are not considered separately.

Reality: (multi-ordinal!) That about which verifiable predictions can be made. The level of reality, then, is determined by the events predicted. For example, horses are real on the 'sensory' level, because a prediction can be made and realized about them at that level ('You can see, touch, etc. a horse'). Unicorns may be said to exist on a different level, but not on the same level as horses, because of the nature of realizable predictions about unicorns ('You will encounter them in literature,' etc.). The number π exists on a still different level. It is assumed in this article that each true proposition is reducible by a series of predictions to a prediction involving structure relations only. For example, 'You can touch a horse' involves the notion 'touch,' which again breaks down into predictions concerning nerve impulses traveling along certain channels, and this in turn involves physio-chemical changes, changes of energy states on submicroscopic levels, etc., down to considerations of structure only. Structural relations are considered here as the most fundamental (general) known reality.

Quantitative definition: An establishment of an evaluation in which a scale of order exists. Examples of terms quantitatively definable are relative humidity, elasticity, infant mortality, rank in the military hierarchy, etc. An attempt is made in this article to establish a quantitative definition of civilization.

Religion: Behavior based on the postulation of 'existence' (level of existence usually not specified) of beings to whom wish reactions are attributed which are reflected in the phenomena of the external world. This behavior is very broad in its scope, ranging from semantic disturbances of magic and taboos to extensive and more or less consistent postulations of systems of ethics. A cosmology is often included in the fields of experience influenced by religion.

Science: All systems of inquiry characterized by investigations of observable phenomena, attempts at clear differentiation of existence levels, attempts at reduction of assumptions, verification by experiment on the sensory level, and heavy reliance on the criterion of predictability.

Semantic disturbance: Semantic reaction of zero or negative survival value, *e.g.,* magic, numerology, chauvinism, prudery.

Semantic reaction: Reactions induced by conditioning, whether to features of the natural environment or to signs, sign-situations, symbols, or symbol-systems. Semantic reactions may be of a low degree of conditionality (*i.e.,* the same stimulus always, or almost always, producing the same response), or of a high degree of conditionality (*i.e.,* the response to the stimulus being conditional upon many other factors, such as internal state of the organism, time, place, context, etc.). Language is an elaborate system of symbols, each involving semantic reac-

tions. As such it may have tremendous survival value, *e.g.*, the reaction to the sounds 'There's a bear!' may prepare one for, or enable one to avoid, the actual encounter with the bear. Semantic reactions of zero or negative survival value are reactions to symbols or signs evaluated without reference to reality, *e.g.*, superstition, racial prejudice, etc.

Survival value: It is at present almost impossible to measure quantitatively the survival value of various modes of behavior except in very simple cases. It is hoped that methods may be developed by which the survival value (relative) of semantic reactions can be experimentally or statstically determined. Of course the survival value for the race as well as for the individual is to be considered.

Structure: In this article the term is used simply as multi-dimensional order. All propositions of mathematics involve structure only.

Taboo: A semantic reaction inhibiting certain behavior. Also the enforcement of such inhibitions by prohibition, *e.g.*, the prohibition of appearance on a motion picture screen of a girl clothed in a tight fitting woolen upper garment, etc.

True proposition: Defined in this article.

Verbalization of behavior: Utterances which transmit a rough knowledge of an inner state of one individual to another, *e.g.*, 'I am hungry,' 'This female is mine.' Animal sounds are also primitive verbalizations of behavior if they induce uniform response in other individuals, *e.g.*, cries of fear, anger, etc.

The men most disdainful of theory get from it, without suspecting it, their daily bread; deprived of this food, progress would quickly cease, and we should soon congeal into the immobility of old China. H. POINCARÉ, *The Foundations of Science*

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If a distinction is to be made between men and monkeys, it is largely measurable by the quantity of the subconscious which a higher order of being makes conscious. That man really lives who brings the greatest fraction of his daily experience into the realm of the conscious. MARTIN H. FISCHER, 'Spinal Cord Education.' *Ill. Med. Jour.* Dec., 1928.

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The current accounts of perception are the stronghold of modern metaphysical difficulties. They have their origin in the same misunderstanding which led to the incubus of the substance-quality categories. The Greeks looked at a stone, and perceived that it was grey. The Greeks were ignorant of modern physics; but modern philosophers discuss perception in terms of categories derived from the Greeks. A. N. WHITEHEAD, *The Principle of Relativity with Applications to Physical Science*

EDUCATION FOR LEADERSHIP*

JAMES S. PLANT

THE problem of leadership is important in its own right. The efficiency and ease of every change and growth in human relationships has depended upon the leadership existing at that time. Beyond that, our own decades present very special problems of leadership in this country. As we move toward collectivism in every phase of our social structure we have not only the pressing problem of leadership in a dramatic and critical change, but also the possibility that a collectivistic society by its nature fails to develop a constant stream of new leaders. We tend to forget that over the last century free enterprise has provided countless small democracies in business and other ventures, which have served to train those who would understand and sympathize with the problems of leadership in our form of governance.

The limits of our discussion may be set in defining four aspects of what is a leader. Obviously I do not ask you to agree with me beyond saying that I am describing a certain sort of person. But we should at least be in agreement as to what we are talking about.

1. A leader tells people where they are going rather than where to go. I would have to admit that history records those great persuaders who have—well, have sort of hypnotized the world or its various groups. But most of the leaders of real power have sensed and galvanized the yearnings and drives of their groups. I would doubt that effective leadership can carry a group beyond what it is 'ready' for, any more than can the educator really teach pupils what they are not ready for.

2. However, the leader makes certain syntheses, certain readjustments, certain new groupings of the needs or 'readinesses' of the group. It is perhaps this —more than anything else—that lends the mirage of his being 'beyond' those whom he leads. The leader often weighs factors differently than the ones being led; he often thinks in terms of multiple causation and partial pressures, but it still holds that the core of the problem lies in his ability to sense the direction of his group and to translate this to them in terms that are meaningful.

Three exceptions to this rule are seen frequently enough to demand a statement. First, in every group there are minority members moving in other directions or not as yet 'ready' to move with the majority. It is true that the leader is apart rather than a part of these. Second, in many instances the directions and goals of a group are not in the field of their own awareness. One sees this clearly in the sex play of early adolescents where the children themselves would be genuinely amazed at there being any sexual implications in their behavior. Effective leadership in such an area seems to those led to be endowed with insights *beyond* them (the insights are obviously

* An address to the Headmasters' Association, at its 52nd annual meeting, Rye, New York, February 10, 1944. Reprinted by permission from *The Educational Record*, April, 1944.

only *into* them). Every great political leader has had his forerunners. While this is only a fraction of the problem of effective leadership, it would be interesting to measure the unsuccessful leaders and then the successful one against a growing pressure from the 'unconscious' strivings of the group as these move more and more closely to the field of awareness. The third exception is seen sometimes when a leader has periods in which he is taken 'on faith' because of some physical prowess or earlier success. I see this in gang formation where blind allegiance is given for even quite extended periods of time.

3. The leader must be an 'all-round' person in the areas involved. He must have empathy — must be down-to-his-soles aware of 'how it would feel' to be one of the led. He must see the problem as the group sees it. Note, however, that the leader in the field of chemistry may be trained in a relatively narrow and specialized area—and his means of communication need not run beyond combinations of chemical symbols. A leader in industrial organization needs to be able to 'feel into' the peculiar problems of organization. (It is precisely here that great trouble arises: leaders of various groups or of various specialties are successful and have sensitivity in the areas of competency involved, but not in those areas which, by chance, are affected by their acts of master leadership.) A leader of people—a political leader—must know how these people feel, how the world looks to them, what *they* strive for, and what they think that they strive for. He cannot be 'dead' in certain parts of human relationships.

4. The leader must be able to communicate in all of these fields of competency. This involves, probably, at least three methods. First, a great deal of communication is carried out through words, numbers, and specific 'measures.' Second, a larger fraction is expressed through what we term the 'psychomotor tensions.' These are the nuances of muscular tension that constitute the *way* that things are said, the *way* one walks or stands. Up to the period of widespread printing, this was the chief mode of communication. Man's deepest and most meaningful messages have been, and still are, those without words. In the schoolroom the teacher is amazed—and disturbed—over the extent to which certain children attain leadership even though they are nonverbalizers. There may be a third mode of communication —one which I am most unsure about—for which perhaps the best word is 'intuition.' Isn't it true that over and above what your student body tells you, you know that they are really telling you something else? It's true that this may really be a process within you—that you are recombining into new relationships what they have told you through the first or second method. I think that I see many leaders who include in their abilities a certain 'know how' which in turn includes an understanding of what persons or groups are driving at even when these matters are stated and acted in quite inadequate fashion. For this very nebulous ability I would use the word 'intuition.'

The second method is of great importance and so is the third—whether it exists as a method of communication or of synthesis. I wish to point out here that persons who are good verbalizers *tend* to exploit the first method and *tend* to disregard the second and third methods.

This leads to six things to be said to the American school about education for leadership.

1. Your particular group could, if it wished, dedicate itself entirely to the training of leaders—even if you were 100 percent successful you wouldn't glut the market. Admittedly you tend to get the poorest material for political leadership. You tend to work with a group that has little real feeling for the masses —has had little chance to know how it feels to wonder whether one can get to the first rung of the ladder. But it is also true that the advantages and abilities of your children put upon you a responsibility for developing leadership that you cannot shirk.

2. The leader must 'know how it feels' to be led. Each of you knows a teacher who can't lead students in a certain subject because he has never had any difficulty in it himself—just as I know doctors who (with all the knowledge in the world) make a poor job of medicine because they don't know how it feels to be sick. I know successful gang leaders, among my boys, who have never been beaten up—but none who does not somehow know really and deeply what the fear of being beaten up is.

Here we have made some pretty bad mistakes—as 'promising' students have appeared we have been too interested in developing that promise. I am sure that training for leadership involves very real experiences in being lost in the group—in being mediocre. This need only be in the fields of competency. That is, a budding genius in chemistry doesn't need to suffer four years of humiliating mediocrity as number five in the racing shell. But at the very least I'm sure that he should be taking certain subjects in which he has to scratch. My own evidence is that this is less training of the mind than training of the soul—for understanding and 'seeing with' those whom he will later lead.

3. The leader must have ability in the field of competency—strength for the gang, speed and accuracy for the Wild West, a high I.Q. for the sciences. He must also be able to communicate freely in the area of the psychomotor tensions and that which I have called 'intuition.' He may have to have other characteristics but will you agree that at least in these our task is to *find* the leader rather than to *make* him? I shall indicate below that there is a large field of development—but this is certainly development of the right material.

The discovery of this material can be made in your own classrooms. Two examples may help. Last year a teacher had in her room a regular devil. He kept the whole class in turmoil. This year she has another apparently quite similar devil—but the class seems to throw him off, to extrude him as soil pushes a stone to the surface. Or a teacher tells us of three children who have made her life unbearable. I see *each* of these—note that in my office I see them separately. Here they are as nice, docile, polite specimens as one would hope for. It is when they are together that trouble brews. As to such clinical material I am sure of two things: first, such examples hold the issues of leadership and when we understand them we will be on the road to what to look for in discovering good leadership material; second, a major part of the problem is tied up somehow in the matter of communication. I grow increasingly sure that the core problem of leadership is not that of the traits of the individual so much as of his ability to receive and give messages at all levels of communication.

Of course all of this assumes a wide chasm between leadership from prowess and that from understanding. Many of your students you term leaders when all you mean is that they are ahead of the

others. We must see the difference between outstanding and understanding persons.

4. Leaders among children quite uniformly have more 'maturity' than the led. Often, in a group, it is the oldest child who is the leader. Often, too, it is the biggest child (as though this were indication that he is the oldest). Almost always it is the one who is, or seems to the children to be, the most mature. I recognize that I am not daring to define 'maturity' even though it is a real and tangible phenomenon in the experience of all of us.

So far as this observation is valid it means that the leader should not crystallize into his specialty until as late as possible. Perhaps here is the outstanding contribution which the four-year liberal arts college has made—and should make—to our society. I make this point here partly because it is germane to the problem of education and leadership and partly because I am convinced that the fight between the four-year liberal arts program and early specialization is as much yours as anyone else's. If it is true—and many believe this—that knowledge is power, then the earlier the technical education the better. But if knowledge is never more than the sharp or accurate tool of power, then education becomes primarily interested in the process of ripening, maturing, aging.

And how late is 'as late as possible'? How long is it practical that a person just grow before it's leadership 'for keeps'? I don't know—any more than you do. Of one thing I feel sure—that the adolescent is not a good leader. He often stands out—that's true. He shames us grown-ups with his forthrightness and unwillingness to compromise. But if, as I believe, the leader is one who tells us where *we* are going instead of one who tells us where *he* is going—then the flaming spirit of adolescence is no fit stuff for leadership. 'As late as possible' must mean at least the early twenties.

5. We come now to what I consider to be the crux of the entire problem—that the training of the leader is largely a matter of training in communication—one which implies that the leader is as good a listener as he is a speaker. Earlier I mentioned three modes of communication. As a challenge to the school two of these need only a word. The one termed 'intuition' if it exists at all as a means of communication is to be allowed rather than to be made to grow. As with the psychomotor tensions the school must be careful that its curriculum-centered interests do not belittle these oldest and most accurate modes of communication. However, I'm sure that in play and in public speaking these two modes can be fostered. Courses and graduate credits in psychomotor tensions we don't need—but there must be education's frank recognition that it is the way a thing is said rather than the actual word content that is important.

What, then, of the third mode—of words and numbers themselves? These are symbols of groups of experiences. The intelligence generalizes—and these generalizations (words, numbers) are manipulated as an intellectual process. Emotional experiences are idiomatic—not to be repeated. If we use the word 'hurry' it means to each of us whatever general extraction we can make from all of the hurrying experiences which we have had. Thus, much that we teach is meaningless to the pupil because his experiences have been inadequate to give meaning to the words which we ask him to use. Unfortunately, too, the pupil soon comes to follow us in giving an almost sacred value to the symbol itself. Today

pupils excitedly bat back and forth the term 'free enterprise' though they have lived and experienced only in a culture quite foreign to that from which this term grew. 'Prayer' is a somewhat forbidding word to a great many people—in spite of the fact that praying experiences are a universal phenomenon. We have already seen the great ones struggling over the word 'sovereignty'—trying to squeeze it into this or that acceptable formula—not able to accept it as a generalization out of cultural experiences entirely different from those of our own generation. Words and numbers are thus not only not realistic, they have life only as each one can implement them out of his own actual experiences, and we have managed to endow them with a power that lays its heavy hands upon us years after they are dead.

The crux of this problem of leadership as a challenge to you thus involves two matters both of which might be subsumed as aspects of the communication of thought and feeling. The first is that we address ourselves to teaching the relationship of symbols to reality rather than continuing our present interest in the manipulation of symbols. There is room, all the way through college, for sensitization in the field of semantics. Nor is this to be in terms of another course—a new specialty. There is scarcely a minute of your curriculum which does not touch upon why we use symbols and what their strengths and weaknesses are in relation to actual life—if you but wish to use it in that manner.

The second is that we consider and use mathematics as a way of thinking about life rather than continuing to make this discipline the mere handmaiden of vocational training in the sciences or engineering. I earlier spoke of the recombination of needs, drives, and conditions which the leader makes. It seems clear that the concepts and symbols of mathematical processes represent the only adequate language for this. And might a mere layman hope that the time will come when leaders can express their conclusions to the led through these same means? So much of what now seems nibbling at real problems, dishonest, opportunistic, and worse arises out of the inability of most individuals to think and communicate in those terms which are served by mathematical concepts and symbols. Until the leader can use mathematics as one of his ways of communicating we will continue to see him forced to inadequate —even wayward—steps as his only means of expression. Mathematical processes as ways of thinking are of transcending importance where there are conflicting human relationships, and the only respectable way of thinking or communicating in these areas is provided by mathematical symbols.

Obviously I am rather brashly calling for a house cleaning in American education. Almost each year sees a new technique for developing more rapid readers. In fact the curriculum is word centered, all of the intelligence tests are word centered, colleges and the 'better' secondary schools vie with each other to have faculty members who are specialists in their subjects instead of specialists in teaching their subjects. And the situation in mathematics is worse—you can count on your fingers the mathematicians in education who can or do give a course on mathematics as a way of expressing thought. Too many of my clients can rattle off all of the number combinations or know the basic equations of differential calculus without ever dreaming that these are anything beyond some tricks to be learned!

Over against this lies my growing as-

surance that much of the confusion which is today's, comes from our inability to communicate with one another in meaningful fashion. Education has done a neat job in the size and variety of the delicacies it has placed on the table. Shouldn't pupils know more about the relationship of food to life?

6. I recognize that much of what has been said makes an assumption regarding leadership which you might not accept. American education has tended to look upon the leader as the strong person. If, for the moment, I oversimplify my thesis to say rather that he is the weak person, it is not to plead for vacillating personalities (mere weather vanes) even though we have had a number of such leaders who have been widely acclaimed, particularly when they were good verbalizers. It is fairer to describe the leader as I know him clinically as sensitive to the interests, drives, and goals of the led. He is particularly capable in the area of communication, though to this should be added his ability to synthesize and recombine what he learns from the group. Once more, may I stress that perhaps since the Renaissance there has been no time when leaders in this sense were more needed. The world is, to each one of its inhabitants, an entirely different place than it was fifty years ago. Our basic needs, our deepest longings in relationship to other people—these are age-old, the stories of our oldest literature are as fresh today as when first told. The primary need today is not for more knowledge but rather for those who (1) can hear the call of these basic needs and (2) can explain them again to people (a) in terms which they can understand and (b) in terms of their relationship to this amazing new mass of technical and social invention.

To say that the problem of leadership is a problem of communication and that education for leadership should be education in communication would be a grotesque oversimplification. But to point to these matters as terribly important and terribly neglected—that's fair enough!

COMMENTS ON DR. PLANT'S ARTICLE

ALFRED KORZYBSKI

DR. JAMES S. PLANT is a well-known psychiatrist specializing in conduct disorders in adults and children, and has to his credit many creative writings. He is an authority on the relation between 'emotions' and the educative process, and he served on a committee of the American Council of Education which made a study of this subject. He is also the chairman of the Executive Committee of the National Committee for Mental Hygiene. Since 1923 Dr. Plant has been the Director of the Essex County Juvenile Clinic, Newark, New Jersey. Such a juvenile clinic gives him a wide experience in the application of psychiatry to education and indicates how the educative process may be a help in solving psychiatric dilemmas. There is no doubt that the problems of psychiatry, education, and so mental hygiene, overlap. In fact it may be considered that any psychotherapy depends on re-education.

The present article, of great importance in general and particularly in these days of reshuffling values, emphasizes the mathematical way of 'thinking', which is very uncommon among psychiatrists.

I may quote here what the eminent mathematician Dr. Hermann Weyl has to say: 'The first difficulty the man in the street encounters when he is taught to think mathematically is that he must learn to look things much more squarely in the face; his belief in words must be shattered; he must learn to think more concretely.' Indeed, there is a current false belief (false knowledge) that mathematics is fundamentally a uniquely abstract way of 'thinking.' This is not really correct. The mathematical way of 'thinking' is 'thinking' in concrete terms of facts, and *labelling empirical 'realities,'* be they configurations of stones or apples or anything else, exemplified in elementary arithmetics in the form of $1 + 1 = 2$. From such extensional beginnings the rest of mathematical generalizations follows, including non-numerical disciplines such as the theory of groups, the theory of invariance, topology, etc.

This is exactly the point where psychotherapy overlaps mathematical ways of 'thinking'; that is, in more concrete terms instead of fiction, away from the inner identifications of high order abstractions with descriptions of so-called 'facts'. (See, for example, Courant and Robbins, *What Is Mathematics?,* Oxford, and Kasner and Newman, *Mathematics and the Imagination,* Simon and Schuster).

Students of general semantics know very well that holding their feet on the ground, in other words, concrete 'thinking', in terms of 'facts', is not only the secret of mathematical 'thinking' but also the very problem we stress in a non-aristotelian training. They know how useful it is in life. Dr. Plant stresses that particular mathematical way of 'thinking' as a key problem in sane orientation and communication.

It happens that the application of scientific *methods,* 1945, and therefore physico-mathematical *methods, should precede any scientific discipline,* including medicine, and so psychiatry. Here we have to face traditional difficulties, among others, that most mathematicians are interested in their technicalities but completely disregard *mathematical foundations,* which show how the human 'mind' works to make the performance of mathematicians possible. They may know their technicalities, and yet they miss the human values of the mathematical *methods* of 'thinking'.

As in mathematics, so also in life, there is no escape from postulates, assumptions, creeds, or some sort of metaphysics. Under such conditions the only solution is to make those unconscious assumptions conscious, which we do in mathematics and in psychotherapy. As Professor Ehrenfest has said (quoted by Darwin): 'To believe that one can make physical theories without unobservable quantities, that is one of the diseases of childhood—*das ist eine Kinderkrankheit.*' The problems of psychiatry are most of the time to eliminate infantilism, through consciousness of the mechanisms involved. This infantilism is the deadly 'Kinderkrankheit' the mathematician Ehrenfest mentions. That's where the mathematical way of 'thinking' and the psychiatric way of 'thinking' meet on common grounds and make this article of Dr. Plant so important for sanity and adjustment.

There is, however, another crucial problem felt vaguely in life, but for the first time nailed down by the discoveries of modern physics; namely, that in life and science we can not consider that sharp formulations correctly represent facts, as there are always characteristics left out. Here I may quote Professor

Charles Darwin, the eminent physicist: '. . . the new physics has definitely shown that nature has no sharp edges, and if there is a slight fuzziness inherent in absolutely all the facts of the world, then we must be wrong if we attempt to draw a picture in hard outline. In the old days it looked as if the world had hard outlines, and the old logic was the appropriate machinery for its discussion.'

It is obvious under such conditions that we can not adequately orient ourselves and evaluate facts by the old rigid two-valued orientations, but must pass to more flexible non-aristotelian infinite-valued orientations of probability.

'Things are better now,' Darwin wrote, 'but mathematicians are still so interested in the study of rigorous proof that all the emphasis goes against the study of probability. . . . I would only say that it is not special new courses that are needed, but rather a change in the spirit of our old courses. . . .' Dr. Plant is fully aware of this when he says that 'the situation in mathematics is worse [than in American education]—you can count on your fingers the mathematicians in education who can or do give a course on mathematics as a way of expressing thought.'

'If these reforms are carried out,' Darwin continues, 'I shall hope that generations will grow up which have a facility that few of us at present possess in thinking about the world in the way which the quantum theory has shown to be the true one. The inaccuracies and uncertainties of the world will be recognized as one of its essential features. Inaccuracy in the world will not be associated with inaccuracy of thought, and the result will be not only a more sensible view about the things of ordinary life, but ultimately, as I hope, a fuller and better understanding of the basis of natural philosophy.'

In a non-aristotelian system we are aiming at the transformation of the old orientations into the new. Because of the structural characteristics of this world, ourselves included, the change of orientation, or if we wish, method of evaluation, had to be formulated. Physicists were the first to request mathematicians to build up many-valued 'logics', which today is an accomplished fact, applicable to science *and life*. We must realize that the old rigid two-valued 'either-or' orientations do not apply to modern science or life in the more fundamental aspects, where we do not deal with 'absolute black' or 'absolute white', but with an indefinite number of degrees of grayness.

The production of many-valued 'logics' is obviously a technical problem, but it had to be done. In our work we achieve that coveted flexibility by the application of what I call the 'extensional devices', which automatically produce infinite-valued orientations, without formal logico-mathematical technicalities. This facilitates enormously our inter-communication, as it eliminates the aristotelian 'all-ness' and rigidity. Let us not be mistaken about it, adequate inter-communication is a prerequisite for social integration, and so a foundation for sanity, and the constructive leadership which Dr. Plant so clearly analyzes.*

* The interested reader may wish to consult the following: 'Logic and Probability in Physics' by Charles Galton Darwin, *Science*, August 19, 1938: 'The Mathematical Way of Thinking' by Hermann Weyl, *Science*, November 15, 1940; Lukasiewicz, and Tarski in the index of *Science and Sanity;* also 'On the Many-valued Logics' by J. Barkley Rosser, *Papers from the Second American Congress on General Semantics*, 1943, p. 79.

GENERAL SEMANTICS:
*An Introductory Lecture**

S. I. HAYAKAWA

Patterns of Reaction

KENNETH Burke opens his book, *Permanence and Change,* with the story of a flock of chickens in a barnyard who are trained to gather around to be fed at the ringing of a bell. Their 'education,' that is, their trained capacity to run forward at the sound of the bell, is a help to them in survival, in that it expedites their feeding. Ultimately, however, the farmer must send his chickens to market. In order to gather them quickly in a convenient place to chop their heads off, the farmer naturally rings the bell. And naturally, they merrily gather around. The disaster, from the chickens' point of view, lies, of course, in their education. The better trained they have been, the easier they are to manipulate, even to their own undoing. One of the chickens, however, let us say, is a moron. He is what we call in educational circles a retarded student. He never learns enough to run forward at the sound of the bell. When the other chickens run forward to their doom, he remains behind —and saves his neck. Perhaps there are undreamed of advantages in never having been to school, or in never having listended to your teachers if you did go.

The point I am leading up to is that, if certain conditions are not met, education may be doing us as much harm as good, in some cases even more harm than good. And the question I am raising is whether we are not, through our usual educational practices both at home and in school, doing more to miseducate than to educate.

Let me make myself clearer. The end product of our education, yours and mine and everybody's, is the total pattern of reactions and potential reactions we have inside our skins. That pattern we have with us always. It is determining the way in which you are listening and interpreting (or misinterpreting) my words, my gestures, my intonations, my appearance, and our surroundings, at this very moment. Some few of you, because of your habitual reaction patterns, will leave here convinced that I am either a communist or a Japanese spy. Some of you, again because of habitual reaction patterns, are listening only for errors or exaggerations or misstatements that I may make so that you may tear my speech to pieces afterwards. Some very few of you may, at the end of the lecture, start shouting Glory Hallelujah, this general semantics is the Great Truth I have been seeking all my life! (I hope Mr. Hauch, secretary-treasurer of the Society of General Semantics, will catch them before they leave and sell them a Foundation Membership.) These same people will go to another lecture a week from now, this time on theosophy, astrophysics, the Old Time Religion, or the Hundred Great Books, and will again find the Great Truth they have been looking for all their lives. The majority of you (and here let me anticipate slightly what is supposed to come later in this

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lecture) will listen attentively, trying both to understand *what* I say and *what makes me say it;* you will delay your reactions, and then tomorrow, or two weeks from now, having tested my words against both memory and experience, you will decide whether this lecture was any good or not beyond being a very mildly amusing way to kill an evening.

Your reaction-patterns are the internal and most important residue of whatever years of education or miseducation you may have received from all your experience, from all your parents' conduct towards you as well as their teachings, from all the formal education you may have had, from all the sermons and lectures you have listened to, from all the radio programs and movies and plays you have experienced, from the conversation you have had with your friends and associates. As the end-product of such experience, some people have reaction patterns such that they habitually confuse what is going on inside their heads with what is going on in the world outside. If the thought passes through their heads that a given state of affairs *might* be so, from then on they act as if it *were* so. In the case of persecution mania, for example, once the thought passes through the patient's head that someone *might be* poisoning him, he acts from then on as if someone *were* trying to poison him.

Some people, and this includes many well known writers and intellectuals, radio commentators and analysts, as well as non-professionals who don't get paid for oververbalizing, have extraordinarily quick verbal responses to everything that happens, and these verbal responses occur so effortlessly and give them so much inward satisfaction that they never know and never will know, whether those responses are adequate or not. In other words, their habitual reaction pattern is to shield themselves from reality by means of a verbal smoke-screen. These people never suspect any inadequacy in themselves, because they are, in our world that values the verbal arts so highly, regarded with envy as dreadfully clever people, because, as the saying goes, 'They are never at a loss for words.'

There is still another reaction pattern, an extreme case of which is exemplified by the people who forget, if they ever knew, that soap-opera is a stylized, dramatic representation of a purported reality, not a reality in itself. These are people who send wedding presents to the radio station when two characters in a soap-opera get married, and write letters of advice to the fictional parents on how to deal with the problems of their fictional children. If any of you are in radio work, you know much more about this type of reaction than I do. But please note that its basis is the confusion of symbols, in this case dramatic symbols, with the realities.

Not 'Meanings of Words'

I could go on describing different kinds of reaction patterns, but this is enough to indicate roughly what I am talking about. Now it is popularly supposed, even by those whose knowledge of semantics and general semantics is based on some reading on the subject, that semanticists deal with 'the meanings of words.' Let us examine that expression, 'the meanings of words' for a moment. Most of us go on the unconscious assumption, sometimes even the conscious assumption, that 'the meanings of words' is to be found by giving 'careful definitions.' So deeply rooted is this assumption that there have been cases of people reading my book, Irving Lee's book, even Korzybski's book, and saying something

like this: 'semanticists believe that if we clear up our definitions all will be well.' (I am not making up this quotation. It is to be found in a learned journal, in a supposedly authoritative study of the general semantics movement.)

Of course, if one stops to think for a moment, it is clear that to define a word means simply to explain words with more words. But, if you will examine what actually happens to people in their conversational and other behavior, most people do go on the assumption that all words CAN be explained with more words. Just the other night someone told me of a meeting where there was a discussion of 'peace' in which everyone present got involved in trying to define 'peace,' so that in the course of an entire evening, no one got anywhere.

So deeply rooted is the assumption that words can be explained fully by more words that it usually comes to us as a discovery, made relatively late in life, and even when made, not made use of, that it is impossible to give a man who has been blind from birth any notion of the color 'red.' Try to describe to someone who has never tasted them the flavor of strawberries. Try to explain to someone who has never loved the meaning of 'love,' or to one who has never been at peace the meaning of 'peace.' Novelists, artists, essayists are always telling us, in one way or another, that the realities of living are *not* the definitions inside our heads. But do we in education, or in ordinary social practice ever make use of this knowledge? Are not our standard means of education, except in progressive circles, the pounding of definitions into students' heads, and asking them to reproduce them again in examinations? Never forget that it is ward-heelers who could not at the point of a gun define terms like 'citizenship,' 'franchise,' 'democracy,' 'due process,' etc., who carry precincts and win elections. Never forget the difference between facility at the verbal level and facility at the level of experience. Never forget the popular adage, 'Those who can, do; those who cannot, teach.' It is an accurate perception into the difference and the possible wide disparity between expertness at *verbal* and *non-verbal* levels.

General semantics, then, does not deal with the 'meanings of words' as that expression is commonly understood. We follow, rather, P. W. Bridgman's advice in his book, *The Logic of Modern Physics:* 'The true meaning of a term is to be found by obesrving what a man does with it, not by what he says about it.' But we must go farther than Bridgman does. He made an enormous contribution to science by showing that the meaning of a scientific term lies in the *operations,* the things *done,* that establish its validity, rather than in verbal definitions. But let us carry his notion outside physical sciences, and see what people do with both the language they use and the language people use at them. Here, let us say, is a personnel manager studying an application blank. He comes to the words, 'Religion, Jewish,' and drops the application blank in the wastebasket. Here is another person who, hearing Orson Welles, fictional radio drama about the 'invasion from Mars,' races down to the recruiting station to fight the Martians. Here is still another who, hearing another fictional drama about how President Roosevelt is going to convert the United States into an American Soviet Republic, writes out a check for ten thousand dollars to a phoney 'League to Save America from Communism.'

If I seem to take a long time telling you what general semantics is about, it is because I am trying, as I tell you, to

train you in a given way of looking at certain facts. General semantics is not any definition I can give of it, any more than the taste of strawberries or the experience of love are the definitions of the words 'strawberry' and 'love.' In all the examples I have given, you will notice that I have paid particular attention, not to words, but to *human conduct* as it has been affected by, directed by, conditioned by words, and other symbols and signs. It is now safe, I trust, to give you a definition, having adequately warned you that definitions are not to be taken too seriously. General semantics is the study and correction of human *responses* to symbols, signs, symbol-systems (including language), sign-systems, and sign-situations. In other words, general semantics is a study of how a *human* nervous system works and ought to work.

I say *human* nervous system because, so far as we know, human beings are the only creatures that have, over and above that biological equipment which we have in common with other creatures, the additional capacity for manufacturing symbols and systems of symbols. If, of course, it occurs in the future that dogs or chimpanzees develop the symbolic capacity, so that they begin to utter not simply sounds but systems of sounds, so that they begin to accumulate historical traditions, folklore, systems of law, symbols of church and state, liturgical dramas, little theater movements, and pile up knowledge from one generation to the next in what we call 'science,' then we would have to include the study of dog and chimpanzee behavior in relation to their symbolic systems in the field of general semantics. At this date, however, our principal concern is still human behavior.

Now a first important tenet of general semantics is that the meaning of words is not in the words, it is in us. If I utter a string of shocking obscenities in front of you now, in Arabic or Hindustani or Swahili, no one would blush, no one would get up and walk out in a huff, no one would report me to the president of the Illinois Institute of Technology as an immoral influence on students. Similarly, if I were to utter a string of shocking obscenities in English to an Arabic-speaking group, nothing would happen. The reason I make myself understood to you at all is that we belong to the same linguistic community: that is, we have *inside our skins* roughly similar ways of responding to the system of sounds we know as the English language.

Similarly, the meaning of that military uniform a member of the audience is wearing is not the uniform, it is in us, and in the nervous system of its wearer. We have been taught to respond to that uniform in certain ways. Set that young man down in Tokyo, where people have been taught to respond to it in other ways, and there would be a noticeable difference in public behavior. The meaning of a smile on another person's face, the meaning of a pair of scuffed shoes on a visitor's feet, the meaning of every little item in our environment, is *inside us, not in the things as such.* You see, therefore, why we prefer to drop the word 'meaning' altogether, especially the expression 'the meaning of words.' We are studying not words as such, not signs or symbols as such, but human evaluations, your evaluations and mine.

'Identification'

Now, no one can tell you in advance what the correct evaluations are of a given utterance, or symbol, or sign, or aspect of experience that you are *going* to encounter. The fact that a Socialist candidate has announced that he is going

to run for congressman in your district at the next election, the fact that the *Chicago Tribune* denounces the appointment of Henry A. Wallace to the cabinet, the fact that your wife announces she is going to get a different style of hair-do, the fact that your little boy comes home from school with a bleeding nose—all these events you will evaluate in your own way, according to time, place, circumstances, and included in the circumstances is your own stock of wishes, hopes, fears, and desires. But to a considerable degree, one can say in advance of the event that if you are ready to vote for *any* candidate because he bears the right party label, or to vote against a candidate no matter how good because he bears the wrong one; if you are ready to oppose *everything* the *Tribune* is for, and are for *everything* the *Tribune* is against (although that is not entirely a bad idea); if you are ready to have tantrums about your wife's new hair-do *before* you have even seen it; if you *always* faint at the sight of blood, if, in other words, your reactions to certain words, signs, situations, are *completely* predictable; if one can count on you to have apoplexy at the mention of Roosevelt's name; if you are certain to quarrel with *every* woman you go out with; if you are *certain* either to stay silent or to hog the conversation in the course of a social evening; then, we can say with tolerable assurance that in your system of responses there is at least one area in which your brains simply don't work; an uninsulated spot which, when touched, immediately results in a short-circuit.

We call this short-circuiting an *identification.* By calling it identification we are calling attention to the fact that, so far as the person is concerned, he identifies (makes the same) all occurrences of a given symbol, so that he reacts with dislike to Mr. Roosevelt, any proposal he makes, any counterproposal he may make later, his cabinet, his administration, his wife, his sons, his dog, and even to 'Roosevelt Road'; he identifies all women as one woman and treats them all alike; he treats all social evenings as one social evening, and behaves the same at each one. If you will think back on all the cases of semantic malfunctioning I have mentioned earlier, you will find that the most general term describing all of them will be 'identification,' where symbol is identified with reality; where the comic strip stereotype for Negroes inside your head is identified with the actual Negro 'out there'; where a verbal invasion from Mars is identified with an actual invasion from Mars; where, as in the case of some philosophers, a verbal account of the universe is identified with the real universe, simply because it is 'logically consistent,' *i.e.,* the words and propositions fit together.

Identification, then, as Korzybski says in his *Science and Sanity,* is a general term describing all cases of semantic malfunctioning. Identification is an internal thing; 'out there' there are not absolute identities. No two Jews, no two Negroes, no two mothers-in-law, no two Ford cars, no two leaves, are identical with each other. If, however, I treat all cases that fall under the same class label, or at the subverbal level, all visual or social configurations that fall into the same pattern, as one, then there is something wrong with me. This notion of identification is, I believe, the most penetrating as well as the most general of all the diagnostic terms used by Korzybski in formulating his general semantics.

The Human Environment

We are now ready, then, I think, for another definition of general semantics: it is the study of identifications, and how

to reduce their number, in the interests of the greater efficiency of our evaluations. In other words, it is the science of how not to be a damn fool. I cannot think of a more useful science, or one that I need more, which is perhaps the reason I spend so much of my time on it.

Identification runs all the way through nature. The capacity for seeing similarities is apparently a necessary survival mechanism for all classes of life. The pickerel, I suppose, identifies all shiny, fluttery things going through the water as minnows and goes after them all in pretty much the same way. Under natural conditions, life is made possible for the pickerel by this capacity. Once in a long time, however, the shiny, fluttery thing in the water happens not to be a minnow but an artificial lure at the end of my line. (This, I admit, is an extremely rare occurrence.) In such a case, one would say that the identification mechanism, so useful for survival, under somewhat more complex conditions that require *differentiation* between shiny-flutter$_1$, and shiny-flutter$_2$, proves to be fatal. We shall say, then, that for survival purposes, the pickerel should have (had its nervous system been capable of subtle a distinction) been able to have different responses to shiny-flutter$_1$ and to shiny-flutter$_2$. And returning to the barnyard chickens at the opening of this lecture, one could say that for survival purposes, the chickens should have (had their nervous systems been capable of so subtle a distinction) been able to distinguish between bell-when-market-quotations-on-fowl-are-high and bell-when-market-quotations-are-low.

Returning to human beings, we see at once that the problem becomes immeasurably more complex. The signs we respond to, and the symbols we manufacture and train ourselves to respond to, are infinitely greater in number and immeasurably more abstract than the signs in a pickerel's environment or a chicken's environment. Lower animals have only to deal with certain brute facts of their physical environment. But think, only for a moment, of what constitutes a human environment; think of the items that call for their adequate responses that no animal ever has to think about: our days are named and numbered, so that we have birthdays, anniversaries, holidays, etc., each calling for specifically human responses; we have history, which no animal has to worry about; we have verbally codified patterns of behavior which we call legal, religious, ethical systems; we have to respond not only to events in our immediate environment, but to reported events in Europe and the South Pacific; we have literature, comic strips, confession magazines, market quotations, detective stories, journals of abnormal psychology, bookkeeping systems; we have money, credit, banking, stocks, bonds, checks, bills; we have the vast symbolisms of moving pictures, paintings, drama, music, architecture, and dress; in short, we move in a vast human dimension of which the lower animals have no inkling, and we have to have a capacity for differentiation adequate to the complexity of our extra environment.

How We Get That Way

The next question, then, is 'Why don't we always have the requisite capacity of differentiation? Why aren't we as sensitive to differences as to similarities? Why do some people react with uniform hostility to all people called "Jews"? Why do we react to words as if they were things? Why do certain patterns of reaction, both in individuals and in larger groups such as nations, persist long after their usefulness has expired? Why is

there a public tendency that can be counted on by unscrupulous employers to blame all strikes on labor rather than on management? Where do we get these compulsive patterns of absolutely predictable uniformity of behavior that are so often suicidal?'

I think I have already made clear that part of our identifications are due simply to biological inheritance, from earlier conditions under which they were necessary survival mechanism. I was once beaten up and robbed by two men on a dark street. Months later, I was again on a dark street with two men, very good friends of mine, but involuntarily I found myself in a panic, and insisted on our hurrying to a well-lighted drug store to have a soda, so that I would stop being so jittery. In other words, my *organismic* reaction to these two men was one of identification, in spite of the fact that the thought never entered my head that I was in any danger. Fortunately, with the passage of time, this identification has died away.

Now as all psychologists will tell you, if terrible experiences happen, especially to a very young child, this kind of identification can very easily set itself up in the child's nervous system, and often causes enormous difficulties in later life. If you take a Freudian view and regard certain behavior disorders as caused by, let us say, fear of the father, notice that if this spreads to fear of *all* older men in later life, again it can be described as identification, so that psychotherapy takes the form of breaking up identifications, until one is organismically convinced, as well as verbally, that these other older men are not your father, and also that your father is no longer the same person, any more than you are the same person, now that twenty or thirty years have elapsed since the onset of the original fear.

Or let us take the point of view of the Adlerian school of psychology that attributes most misevaluations to feelings of inferiority. Are not identifications again at work, organismal identifications that create responses to all social situations as one situation, regardless of the fact that in one situation you may actually be superior, in another inferior; that during the course of one evening, you may be on one topic of conversation the best informed, or another topic, the least informed? And is not psychotherapy again directed in such cases toward the breaking up of identifications, so that you are able to step forward when called upon to step forward, to take a back seat when that's where you belong, instead of stepping forward and trying to be the center of attraction *all* the time, or on the other hand, hiding in a corner and trying to escape notice *all* the time?

Further identifications are caused, as any sociologist will, I believe, agree, by communal patterns of behavior, which were necessary or thought necessary at one stage or another in the development of a tribe or nation. General directives such as 'Kill all snakes,' 'Never kill a cow, which is a sacred animal,' 'Shoot all strangers on sight,' 'Fall down flat on your face before all members of the aristocracy,' or, to come down to more modern times, 'Never vote for a Republican,' 'Oppose all subsidies,' are undoubtedly an enormous factor in the creation of identifications. Some human beings, possibly in their private feelings a majority, can accept these directives in a *human* way: that is, it will not be impossible for them under a sufficiently changed set of circumstances to kill a cow, or not to bow down before an aristocrat, or to vote for a Republican.

Others, however, do get these directives so ground into their nervous systems that they become incapable of changing their responses. Still others, although capable of changing their responses, dare not do so for fear of public opinion. The goal of social therapy is again, like the other therapies I have mentioned, the breaking up of absolute identifications. Society must obviously have patterns of behavior; human beings must obviously have habits. But when those patterns become inflexible, so that a tribe has only one way to meet a famine, namely, to throw more infants as sacrifices to the alligators; or a nation has only one way to meet an economic crisis, namely, to raise the tariffs, then such a tribe or such a nation is headed directly for disaster.

Furthermore, and here one must touch upon the role of newspapers and the radio, if certain propaganda agencies hammer away incessantly at the production of, let us say, a hostile set of reactions at such words as 'New Deal,' 'bureaucrats,' 'Wall Street,' 'international bankers,' 'labor unions,' etc., no matter how useful an immediate job they may perform in correcting a given abuse at a given time and place, they can in the long run produce in thousands of readers and listeners identification reactions to those words—reactions that will make intelligent public discussion impossible. In this case, however, we are not dealing with probabilities but with actualities. We all know the role of *over*-indoctrination, of *over*-sensitization of the German public to the connotations of such words as 'Jew,' that Hitler employed to bring himself to power. We all know how the larger part of, for example, the advertising profession, is engaged as a life-work in the creation of another kind of identification behavior, namely, the favorable response to *every* occurrence of the brand name they are paid to publicize. (It is interesting to note here in passing, by the way, that the advertising of consumer cooperatives does not promote identification behavior. It encourages you to buy Co-op label goods, to be sure. But it also tells, in the interests of the consumer, where to get other goods if they happen at a given time to be better than their own product.)

Linguistic Traps

So far I have dealt with causes of identification behavoir that are dealt with more fully and more competently in other fields of knowledge, such as psychology and sociology and public opinion research. I have tried to show you how our semantic formulation of those problems gives them a common core.

General semantics, in addition to aiding in the reformulation of problems in the other sciences, makes another contribution of its own, that is, the study of the language we use and the study of our day-to-day linguistic habits. Something that must never be forgotten is that our everyday language is an inherited thing, based directly on the languages of our primitive linguistic ancestors, Anglo-Saxons, primitive Germanic tribes, primitive Indo-European tribes. With their scant knowledge of the world, they had ways of formulating the various events before them, such as the statement, 'The sun rises,' We do not today believe that the sun 'rises'; we believe that the earth turns to meet the sun. Nevertheless, we still continue to say 'the sun rises,' *without believing what we say.* The statement will do, we feel, for practical purposes.

But are we as wise about other things as we are about the sunrise? We make an observation, 'Negroes are lazy and shiftless.' Thereupon, unlike the occasion when we say 'the sun rises,' we *believe*

what we say. We tend to believe that 'laziness' and 'shiftlessness' are 'qualities' that 'inhere' in Negroes. What are the facts? Under conditions of slavery, where you don't get paid for working, and under later conditions, where even if you work hard the chances of your social or economic advancement are very slim, there isn't any point in being an industrious and responsible worker. The distinguished French abstract artist, Jean Hélion, told us in a lecture in Chicago not long ago the story of his life as a prisoner in a German camp; he was doing forced labor. He told us how he loafed on the job, how he thought of device after device for avoiding work and producing as little as possible, how he stole at every opportunity, and how he put on an expression of good-natured imbecility and stupidity whenever approached by his Nazi overseers. Without intending to do so, in describing himself, he gave an almost perfect picture of the literary type of Southern Negro of slave days. The statement 'Negroes are lazy' then, is the crudest kind of observation with entirely wrong implications about the structure of the facts: like 'the sun rises.' *The point I am driving at is not simply the fact that people make such statements; the additional and much graver fact is that they believe themselves when they are making them.*

Dr. Douglas Campbell tells of the patient who formulated her problem thus: 'My husband makes me sick.' She was powerless, she said, because she had no control over the situation. *Her husband* MADE her sick, even when she didn't want to be made sick. I don't know what ultimately happened to the case, but Dr. Campbell reports that the first step he took with her was to teach her a different formulation of the situation, namely, *'I react* to my husband's behavior with sickness.' Notice the differences in the implications: in the first formulation, *everything* is the husband's fault; in the second, *two* possibilities are suggested, namely, that *I* start reacting differently, and that *he* starts changing his behavior.

Let's take another example. You know, of course, that blood donations from Negroes are said to be separated from blood donations from whites, because white people might object to being given a transfusion of 'Negro blood.' This would have been a reasonable objection (1) if there were anything especially wrong with Negroes, and (2) if this were the Middle Ages, when it was believed that physical or mental characteristics were communicated by blood, or if it were an even earlier culture, where it is believed that by eating rabbit meat you become timid. Nevertheless, although it is both widely known and well established that the transfusion of Negro blood will no more make a Negro out of you than eating French-fried potatoes will make you a Frenchman, large sections of our society still take the whole business seriously—seriously enough to reduce appreciably the enthusiasm of many Negro citizens about contributing to the war effort.

I wonder if I am communicating to you any sense of both the magnitude and the intimacy of the problem? The deliberations of statesmen, theories about what to do with Germany after the war, as well as how people treat children at home or in the classroom, turn upon two things (1) their way of linguistically formulating the problems, and (2) the adequacy of their evaluation mechanism, *i.e.,* whether it is reasonably free of pathological identifications. The achievement of full humanity by human beings requires, on the part of our rulers, fully human habits of evaluation as well as

expertness in the formulation of problems in such ways that one can get somewhere. The achievement of a reasonable degree of satisfaction and happiness in your work and in your home also requires *fully human habits of evaluation* as well as *flexibility in the formulation of problems.* How do we propose to go about achieving these conditions?

An Educational Theory

A final definition of general semantics I shall give you then, is this: general semantics is an educational theory whose aim is to study the evaluational processes of human beings, comparing and contrasting the evaluational processes of great scientists and artists with the evaluational processes of the mentally ill; comparing and contrasting the evaluational processes which a man may use in his successful business with the evaluational processes which he may be using in his miserable home life; and then, on the basis of these comparisons, finding the places at which pathological identifications occur and striving to eliminate them. Furthermore, general semantics as an educational method strives to train people in such ways that, knowing enough about the facts of language and of symbolism and of how their evaluational mechanisms ought to work, they are prepared *in advance* against the tendency to make pathological identifications.

General semantics, then, is ultimately a non-verbal discipline. It is a discipline in silence, of dissolving away the encrusted verbalizations and abstractions, the dogmas and creeds that envelope most of us like layers of barnacles. It is a discipline in first seeing, hearing, experiencing both the outside world and one's most inward feelings, so that, when we say something, we do a little more than repeat a formula or make an empty noise that further confuses the semantic environment. *If the ultimate 'meaning' of words is a non-verbal reality, our first prescription is a sharper awareness of the world of not-words.* Against that sharper awareness, it will be possible for us to make somewhat more meaningful statements than we are accustomed to making. And having made them, we will not be satisfied with them, because we are always aware that the non-verbal realities (like the taste of strawberries) is ultimately not communicable.

Are you familiar with the self-important sort of person who, in addition to hogging the conversation, constantly comes out with especially fatuous remarks? And having made such remarks, have you observed the slow smile of pleasure spread across his face, as he sits astonished with the brilliance and profundity of his own thought? Are you familiar with the bigot, the one-track mind, who knows in advance everything that you can possibly tell him, and who, seized with holy and fanatical zeal, seeks to advance, regardless of time, place, or circumstances, a single set of verbal formulae as the Ultimate Truth? You must be familiar, too, with that all too common sight in our society, the person, who, whether in a dreamy way or in an unsettled and jumpy way, is always talking, talking, talking, talking, getting himself more snarled up every day the more he talks? These are some examples of people who are *not* semanticists. To such people, as well as to a large number of other over-verbalized people in our culture who are not only confusing themselves but making confusion epidemic, the semanticist can only say, *'What are you talking about?'* The fact that this question practically never receives a serious answer indicates the magnitude of the task before us.

LINGUISTIC THEORIES OF THOMAS HOBBES AND GEORGE CAMPBELL

GORDON HOSTETTLER *

RHETORICIANS from pre-aristotelian times have been interested in language and its influences upon human behavior. A survey of modern textbooks, however, will immediately show that Aristotle's influence on linguistic theories is still considerable. Aristotle, as Korzybski has pointed out,[1] took the language of his times for granted when he developed his extensive systems of logic, ethics, politics, etc. Thus, when he came to the subject of language in his *Rhetoric* he was concerned only with 'externals,' *i.e.*, the development of an orator's 'style' and the ways and means of achieving euphonious rhythms, clever phrases, apt figures of speech, grammatical purity, etc.[2] Many rhetoricians, probably because of the esteem in which the Stagirite's writing were held during the Middle Ages, have adopted a similar attitude toward language, modifying details only. Consequently they too have been unaware of the silent assumptions of 'allness,' the 'identifications,' etc. which the structure of language imposes on what they have labeled 'logic,' 'argumentation,' or 'persuasion.'[3]

With the advent of the Renaissance, however, and with the beginnings of scientific methodology and its 'revolutionary' use of language, some rhetoricians began to investigate more thoroughly the influences of language which had been taken for granted in previous rhetorical systems. This paper is concerned with the contributions of two such men. While they lived over a century apart, it may be said that both men set forth their observations relative to the uses and influences of language in times when the newly found scientific method was only beginning to free men from the static concepts of the Middle Ages. These men are Thomas Hobbes (1588-1679) and George Campbell (1719-1796).

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[1] Alfred Korzybski, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics*. Lancaster, Pa.: Science Press, 1933, p. 371.

[2] See *The Rhetoric of Aristotle*, translated by Lane Cooper. New York: D. Appleton-Century Co., 1932, p. 185-219.

[3] Indeed, this attitude toward language became so widespread that in various periods of history 'rhetoric' was considered by some to include little more than the adornment of any idea with ornate verbiage. It was this recurring emphasis on 'style' which has been mainly responsible for the questionable reputation which rhetoric seems to have acquired in many quarters. See:

Charles S. Baldwin, *Ancient Rhetoric and Poetic*. New York: Macmillan Co., 1924, p. 87-101.

Charles S. Baldwin, *Medieval Rhetoric and Poetic*. New York: Macmillan Co., 1928, p. 2-50.

William P. Sandford, *English Theories of Public Address, 1530-1828*. Columbus, Ohio: H. L. Hedrick Co., 1938, p. 17-20; 40-49; 85-96; 126-37.

Considering the times in which they wrote, both Hobbes and Campbell developed linguistic theories which seem surprisingly 'modern.' The intent of this paper, however, is not to show that these men had the 'same' approach to language as that developed by Korzybski and other contemporary semanticists. Rather the purpose is to indicate how two rhetoricians, with the scientific background of their days, dealt with and analyzed the problems of language.

Thomas Hobbes

Strictly speaking, Hobbes cannot be labeled a 'rhetorician.' His main interests centered in the field of political philosophy where he strove to develop an absolute theory of government which would justify the doctrine of the 'absolutism' of kings. It was to this purpose that he wrote his famous *Leviathan* with which we are here concerned. Like most 'philosophers,' Hobbes began his work with what seemed to him to be 'first principles.' To arrive at these principles, he considered, in his first book, the 'natural state of man.' This discussion led him to write his brief section, 'Of Speech.' Let us first outline his linguistic theory and then evaluate it in terms of the principles of general semantics.

Hobbes introduced the subject of language by pointing out that men are differentiated from other life forms by their ability to communicate through speech:

> The most notable and profitable invention of all other, was that of *Speech,* consisting of Names or Appellations, and their Connexion; whereby men register their Thoughts; recall them when they are past; and also declare them one to another for mutuall utility and conversation; without which, there had been amongst men neither Commonwealth, nor Society, nor Contract, nor Peace, no more than amongst Lyons, Bears, and Wolves.[4]

This approach to the functions of language in human affairs bears a striking resemblance to Korzybski's concept of 'timebinding.' The uses which each writer made of the idea are widely divergent, but both agree that it is language which differentiates men from animals.

Hobbes was also conscious that it was from words alone that logicians acquired their concept of 'universality':

> Of names, some are proper and singular to one onely thing: as *Peter, John, This Man, This Tree;* and some are common to many things; as *Man, Horse, Tree;* every of which, though but one name, is nevertheless the name of divers particular things, in respect of all which together, it is called a *Universall;* there being nothing in the world Universall but Names, for the things named are everyone of them Individuall and Singular.[5]

That human judgments depend upon the ways in which language is used constituted Hobbes' next point: *'True* and *False* are attributes of Speech, not of Things. And where Speech is not, there is neither *Truth* nor *Falsehood.'*[6] And again:

> Between true Science and Erroneous Doctrines, Ignorance is in the middle. . . . Nature it selfe cannot erre; and as men abound in copiousnesse of language; so they become more wise, or

[4] Thomas Hobbes, *Leviathan.* London: J. M. Dent and Sons, Ltd., Everyman's Library edition, 1934. (First edition, 1651), p. 12. The italics and spelling are Hobbes'.

[5] *Ibid.,* p. 13.

[6] *Ibid.,* p. 15.

more mad than ordinary. Nor is it possible without Letters for any man to become excellently wise, or . . . excellently foolish. For words are wise men's counters, they do but reckon by them; but they are the mony of fooles that value them by the authority of an Aristotle, a Cicero, a Thomas, or any other Doctor whatsoever, if but a man.[7]

These concepts led Hobbes to the problems of definition:

> Seeing that *Truth* consisteth in the right ordering of names in our affirmations, a man that seeketh precise *Truth*, had need to remember what every name he uses stands for; and to place it accordingly; or else he will find himselfe entangled in words, as a bird in lime-twiggs; the more he struggles, the more belimed.[8]

In order to better appreciate the foregoing passage, it is necessary to know that in his previous chapters Hobbes maintained that a man could know nothing which he did not receive through his senses.[9] Thus, that a man should remember what the words he uses 'stand for' means that they should be founded on his experiences. Indeed, 'right' definitions of words constitutes the crucial point which Hobbes tried to establish relative to language: 'In the right Definition of Names lyes the first use of Speech. And in wrong or no Definitions, lyes the first abuse, from which proceed all false and senslesse tenets.'[10]

If we apply the 'meanings' of general semantics to some of the passages cited,[11] Hobbes' linguistic theory would indeed appear 'modern.' But when the terminology is examined in the senses in which Hobbes employed it, we at once note inadequacies. One of the crucial terms is 'science.' To Hobbes 'science' implied systems in which would exist the same degree of certainty as in geometry.[12] That is, as the subsequent development of his political theory indicates, he wished to formulate immutable 'first principles,' and from them, in Aristotelian fashion, to construct syllogisms which would lead to inescapable conclusions. In his own words:

> . . . When the Discourse is put into Speech, and begins with the definitions of words, and proceeds by the connexion of the same into generall affirmations, and of these again into Syllogismes; the Ende or last Summe is called the Conclusion; and the thought of the mind by it signified, is that conditionall Knowledge, or Knowledge of the consequence of words, which is commonly called Science.[13]

By 'conditionall knowledge' Hobbes simply means that the conclusions reached are conditioned or determined by the statements which have gone before. Thus if a man has 'rightly defined' his terms at the beginning, and uses them in the 'same' sense in each succeeding syllogism, the conclusions will be 'certain.'[14]

[7] *Ibid.*, p. 15-16.
[8] *Ibid.*, p. 15.
[9] *Ibid.*, p. 3-12.
[10] *Ibid.*, p. 15. The 'first abuse of speech' had been previously declared to occur 'when men register their thoughts wrong, by the inconstancy of the signification of their words . . . and so deceive themselves.' *Ibid.*, p. 13.
[11] Terms such as 'science,' 'right ordering or words,' 'nature,' 'more mad than ordinary,' etc.
[12] 'Geometry . . . is the onely Science that it hath pleased God hitherto to bestow upon mankind.' *Leviathan, op. cit.*, p. 15.
[13] *Ibid.*, p. 31.
[14] *Ibid.*, p. 41.

With this view of 'science,' despite his recognition of *some* of the pitfalls inherent in language, Hobbes was led into 'absurdities' of his own. He accepted the Aristotelian system, *i.e.*, he 'discovered' 'first principles'; he joined words, carefully 'defined' to be sure, to form 'universal' statements; and he then drew conclusions according to the rules of syllogistic logic. Thus he was unable to escape the inevitable silent impositions of the 'is' of identity, 'allness,' etc., and the consequences are clearly revealed in the subsequent books of the *Leviathan*. Here he 'proved' that governments possessing 'soveraigntie' can promulgate no 'unjust law';[15] that the primogeniture system of land inheritance is a 'law of nature';[16] that only those books of the Bible acknowledged by the Church of England contain the 'laws of God';[17] etc. etc. As George Campbell was to point out a century later:

> 'It is a saying of Hobbes' . . . that "words are the counters of wise men, but the money of fools." The thought is ingenious and happily expressed. I shall only remark upon it, that this noble writer may be produced . . . to prove that it is not peculiar to fools to fall into this error.'[18]

Another major shortcoming in Hobbes' theory was his failure to recognize that 'facts' are the joint result of the observed and the observer. He realized that men could only know what they experienced through their senses;[19] he understood that words were only symbols for these experiences;[20] and he was cognizant of the fact that men were unable to agree on the nature of the events which certain 'abstract' terms represented.[21] But he thought that words could be employed as if they were the same as events in nature, and he thus concluded that 'Knowledge of Facts . . . is Absolute Knowledge.'[22] This approach, of course, ignored the role of the observer, and led Hobbes to consider such evaluative words as 'hot,' 'red,' 'good,' 'right,' etc. as qualities of the events themselves which could be used, in the grammatical sense, as substantives.[23] Thus, he thought the function of philosophy was to discover 'right' or 'absolute' definitions on which men could agree. Here we find a main reason for some of the absurd 'laws of nature' cited above; namely, that Hobbes identified his own feelings, which were conditioned by his culture, with the events which he observed.

Much more could be written to demonstrate inadequacies in Hobbes' linguistic theory, but the above should serve to illustrate some of the main deficiencies. Indeed, upon a brief review, Hobbes' theory might seem to consist of little more than a series of observations regarding language. These observations, however, were markedly advanced for 1651, especially when considered in relation to other theories of language which rhetoricians had advanced up to that time. Hobbes was one of the first writers in 'modern' times who did not take his language for granted. He was conscious of some of the effects of words upon human 'reasoning,' and he tried, at least, to devise a linguistic system which he thought would minimize these effects.

[15] *Ibid.*, p. 92; 185.
[16] *Ibid.*, p. 80-81. See also chapters 14 and 15.
[17] *Ibid.*, p. 202.
[18] *The Philosophy of Rhetoric.* London: William Baynes and Sons, 1823, (First edition, 1776), p. 278.
[19] *Leviathan, op. cit.*, p. 3-12.
[20] *Ibid.*, p. 13.
[21] *Ibid.*, p. 17-18.
[22] *Ibid.*, p. 41.
[23] *Ibid.*, p. 12.

George Campbell

George Campbell's *Philosophy of Rhetoric* (1776) contained several innovations as regards rhetorical theories. First, in direct contradiction of classical theory, he arrived at the 'obvious' conclusion that men do not always speak with the sole view of 'persuading' their fellows. Thus, he took a much broader view of the nature of speech than his predecessors, and he devised a classification of speech purposes which is still widely used in speech texts. Second, he applied the principles of faculty psychology, 'new' in his day, to the analysis of audiences. And third, he developed a most comprehensive theory, with which we are here concerned, relating to the use of language.[24]

Campbell was led to consider the problems of language because of his analysis of the ways in which men acquire knowledge and because of his realization that grammatical purity alone does not insure clarity in speaking or writing. His linguistic theory is largely set forth in a short chapter in his section on 'style,'[25] but to appreciate more fully this theory it is necessary to revert to his first section wherein he deals with 'human reasoning.'

'Logical truth consisteth in the conformity of our conceptions to their archetypes in the nature of things.'[26] By this 'common-sense' statement Campbell revealed his basic orientation as regards the acquisition of knowledge and the use of logic. He distinguished two types of 'reasoning' or ways in which truth can be discovered—the 'scientific' and the 'moral.' He did not employ these terms, one must hasten to add, in the senses in which we do today. 'Scientific reasoning' referred to the methods used in the mathematical systems of his day (algebra and geometry), while 'moral reasoning' referred to the methods whereby men acquire knowledge by direct observation of their natural and social environment.[27] The main difference between the two, Campbell declared, is that while moral reasoning admits of probabilities and degrees of truth, mathematical demonstration deals in absolutes. In his own words:

> In mathematical reasoning . . . to affirm the conclusion is false implies a contradiction; in moral reasoning, though the procedure of the mind were quite unexceptional, there still remains a physical possibility of the falsity of the conclusion.[28]

While he recognized that both methods are useful, he concluded that moral reasoning is the superior. This conclusion was based on the belief that mathematical demonstration is applicable only in a very narrow field, whereas the inductive method is widely useful:

> Abstract truth . . . is almost entirely confined to quantity, concrete or discrete. The sphere of demonstration is narrow, but within her sphere she is a despotic sovereign . . . Her rival [moral reasoning], on the contrary,

[24] Lester Thonssen, *Selected Readings in Rhetoric and Public Speaking*. New York: H. W. Wilson Co., 1942, p. 231. Sanford, *op. cit.*, p. 110-15.

[25] The chapter is significantly entitled: 'What is the Cause that Nonsense so often Escapes being Detected, by the Writer and the Reader?' *Philosophy of Rhetoric, op. cit.*, p. 281-299.

[26] *Ibid.*, p. 49.

[27] *Ibid.*, p. 58. Thus, Campbell's 'moral reasoning' should be considered the equivalent of what we term the 'scientific method' today.

[28] *Ibid.*, p. 76. This distinction is earlier developed in greater detail. *Ibid.*, p. 58-61.

> hath less power, but wider empire. Her forces, indeed, are not always irresistible; but the whole world is comprised in her dominions. Reality or fact comprehends the laws and works of nature, as well as the arts and institutions of men . . .[29]

It should be noted that Campbell made no distinction, as seems to be our custom today, between the 'natural' and 'social' sciences. He believed that progress in all fields of human endeavor, except mathematics, depends upon the discovery of knowledge based directly on observation of all varieties of human environment. He even went so far as to include religion as a field in which moral reasoning should be applied,[30] and this view from a Doctor of Divinity in 1776 is startling, to say the least. Inadequacies in Campbell's theories will be noted later, but it does not seem amiss here to point out that over a century and a half ago this rhetorician arrived at what may be described as the basic purpose of general semantics—namely, the application of the scientific method to all fields of human experience.

It should also be noted that Campbell recognized that mathematical systems may prove very useful in solving human problems. For when mathematics are 'applied to things and combined with discoveries . . . our researches into nature in a certain line are facilitated, the understanding enlightened, and many of the arts, both elegant and useful, are improved and perfected.'[31] Appropriately, Campbell indulged in an interesting speculation regarding the possibility of applying mathematical theories of chance to aspects of human life which do not seem subject to cause and effect sequences.[32]

Since men are to acquire their most useful information from observation of their environment, Campbell next considered the processes whereby this knowledge is translated into usable forms. Reflecting the faculty psychology of his time, he pointed out that the 'senses' and 'the memory' are basic to moral reasoning.[33] He also pointed out the importance of the role of speech or 'testimony' which enables men to communicate and receive from others knowledge derived from personal observations. Indeed, like Korzybski, he declared that it is this ability which differentiates men from animals:

> By the first [direct personal experiences], I question not, a man might acquire all the knowledge necessary for mere animal support in that rudest state of human nature (if ever such a state existed) which was without speech, and without society; to the last [testimony] we are indebted for everything which distinguished the man from the brute.[34]

[29] *Ibid.*, p. 61.

[30] 'Under the general term I also comprehend natural theology and psychology, which, in my opinion, have been most unnaturally disjoined by philosophers. Spirit, which here comprises only the Supreme Being and the human soul, is surely as much included under the notion of natural object as body is, and is knowable to the philosopher purely in the same way, by observation and experience.' *Ibid.*, p. 68.

[31] *Ibid.*, p. 61.

[32] *Ibid.*, p. 71-73.

[33] 'The senses, both external and internal, are the original inlets of perception. They inform the mind of the facts which . . . are situated within the sphere of their activity, and no sooner discharge their office in any particular instance, than the articles of information exhibited by them are devolved on the memory. Remembrance instantly succeeds sensation, insomuch that the memory becomes the sole repository of the knowledge received by sense; knowledge which without this repository would be as instantaneously lost as it is gotten . . .' *Ibid.*, p. 62.

[34] *Ibid.*, p. 70-71.

Campbell then proceeds to the method whereby experiences are combined to form generalizations:

> With regard to the similar circumstances of different facts . . . the mind acquires a habit of retaining them, *omitting those circumstances peculiar to each, wherein their differences consist.* Hence if objects of any kind, in a particular manner circumstanced, are remembered to have been usually, and still more if uniformly, succeeded by certain particular consequences, the idea of the former . . . immediately associates the idea of the latter; and if the object itself, so circumstanced, be presented to the senses, the mind instantly anticipates the appearance of the customary consequence. This holds also inversely.[35]

The similarity of this notion, especially the noting of the omission of differences, to that of 'abstracting' in general semantics is striking. And that Campbell did refer to the same thing is revealed when he actually employed the term when discussing this process later:

> . . . If anyone is pleased to call that faculty by which a particular idea is regarded as representing a whole order by the name *abstraction,* I have no objection to the term; nay more, I think it expressive of the sense:—whilst certain qualities remain unnoticed, and are therefore *abstracted from,* those qualities only which it hath in common with the order engross the mind's attention.[36]

Further, Campbell recognized that this process of abstracting can be carried to higher and higher levels, and that, because of the continual omission of differences, each new abstraction is less certain than its predecessor:

> When by way of induction, the mind proceeds from individual instances to the discovery of such truths as regard species, and from these again, to such as comprehend a genus, we may say with reason, that as we advance, there may be in every succeeding step, and commonly is, less certainty than in the preceding; but in no instance whatever can there be more.[37]

Because this is true, Campbell concluded that when any particular object or event is under consideration, direct observation is to be preferred to the application of a generalization previously reached, because:

> When we descend to particulars, the conclusion necessarily becomes weaker, being more indirect. For though all the known circumstances be similar, all the actual circumstances may not be similar; nor is it possible in any case to be assured that all the circumstances are known to us.[38]

This general point of view, quite naturally, led Campbell to be critical of the traditional Aristotelian mode of logic. In his satirical chapter, 'Of the Nature and Use of the Scholastic Art of Syllogizing,' we find the following statements, representative of his opinions:

> . . . If a syllogism be regular in mood and figure, and if the premises be true, the conclusion is infallible. The whole foundation of the syllogistic

[35] *Ibid.*, p. 62-63. The Italics are mine.

[36] *Ibid.*, p. 286. Further, Campbell was aware that abstracting depends upon speech: '. . . Nothing can be more evident than that the power of abstracting, as I have explained it, . . . must be as early as the use of speech . . .' *Ibid.*, p. 288.

[37] *Ibid.*, p. 79.

[38] *Ibid.*, p. 70.

art lies in these two axioms: 'Things which coincide with the same thing, coincide with one another'; and 'Two things, whereof one does and one does not coincide with the same thing, do not coincide with one another.' On the former rest all affirmative syllogisms, on the latter all the negative. Accordingly, there is no mention here of probability and degrees of evidence, than in the operations of geometry and algebra . . . whereas, in the inductive method of reasoning, it often happens, that from certain facts we can deduce only probable consequences.[39]

. . . The proper province of the syllogistical science is rather the adjustment of our language, in expressing ourselves on subjects previously known, than in the acquisition of knowledge of things in themselves.[40]

Errors in regard to the signs [in syllogisms] tend not only to retard the progress of knowledge, but to introduce errors in regard to the things signified.[41]

. . . We invariably [in scholastic disputation] recur to words, and are at immense pains to lose ourselves in clouds of our own raising. We imagine we are advancing and making wonderful progress, while the mist of words, in which we have involved our intellects, hinders us from discerning that we are moving in a circle all the time.[42]

Before quitting Campbell's views on logic, we should note that he was quite aware of the assumptions on which his inductive system rested—such assumptions as, 'Whatever has a beginning has a cause,' 'The course of nature will be the same tomorrow that it is today,' etc.[43] While these assumptions are no longer basic to many of the scientific theories in 1945, it must be remembered that they were the bases of the science of 1776. In this regard, moreover, Campbell revealed further evidence of the soundness of his orientation when he pointed out that these assumptions, as in any logical system, can not be 'proved.'[44] And he went to great pains to expose the 'absurdities' of those 'philosophers' who attempted to 'prove' them by syllogistic 'reasoning.'[45]

In the development of his concepts of logic Campbell of necessity offered several observations regarding language, but it was not until he reached the traditional section on 'style' that he fully expounded his linguistic theory. After outlining the usual approaches to correct grammar, he plunged into the subject of clarity or 'perspicuity' in writing. Here he led up to the conclusion that 'Grammatical purity, in every tongue, conduceth greatly to perspicuity, but it will by no means secure it.'[46] He listed several examples to

[39] *Ibid.*, p. 78-79.
[40] *Ibid.*, p. 82.
[41] *Ibid.*, p. 84.
[42] *Ibid.*, p. 86.
[43] *Ibid.*, p. 55.
[44] 'All reasoning necessarily supposes that there are certain principles in which we must acquiesce, and beyond which we cannot go . . .' *Ibid.*, p. 57.

On this same point Korzybski states: 'There is no escape from the fact that we must start with undefined terms which express silent, structural creeds or metaphysics. If we state our undefined terms explicitly, we, at least, make our metaphysics conscious and public, and so we facilitate criticism, cooperation, etc.' *Op. cit.*, p. 373.
[45] *The Philosophy of Rhetoric, op. cit.*, footnote, p. 86-7.
[46] *Ibid.*, p. 240.

illustrate his point,[47] and then sought by reasons why this should be.

Campbell began the discussion of his linguistic theory by pointing out that 'Mere sounds, which are used only as signs . . . have no natural connection with the things whereof they are signs.'[48] To discover, then, how words are able to convey knowledge, Campbell declared we must understand the connection which subsist (1) among things, (2) between words and things, and (3) among words or the different terms used in the same language.

The 'connections existing among things' he considered 'original and natural,' and he declared 'we become acquainted with [these connections] by experience; and they prove, by means of association, the source of various combinations of ideas and abstractions . . .'[49] Here it might be well to consider Campbell's view of the 'nature of things' which he had described earlier:

> . . . On a closer acquaintance with those objects wherewith we are surrounded, we come to discover that they are mostly of a compound nature . . . comprehending a mixture of bodies, often very different in their nature and properties, as air, fire, water, earth, salt, oil, spirit, and the like. *These, perhaps, on deeper researches will be found to consist of materials still simpler.*[50]

It is thus apparent that Campbell was operating on what we now call the 'macroscopic level,' and it can be concluded that his 'connections between things' also referred to that level. We know today that any system based on this level will prove to be inadequate; but again we must remind ourselves that he was writing a century before scientists were able to construct a table of chemical elements, let alone develop the electronic theories which we are now utilizing. Moreover, the last sentence cited shows that Campbell knew he was not dealing in absolutes and that he was ready to modify his conceptions on the presentation of new evidence. In other words, Campbell adapted his theories to the science of his day, and, to paraphrase Korzybski, for sanity, the creeds utilized in 1776 should be of the issue of 1776.

Campbell then turned to the 'relations of words to things' which, he again noted, 'is not a natural and necessary, but an artificial and arbitrary connection.'[51] Through frequent usage, he added, 'though this connection hath not its foundation in the nature of things, but in the conventions of men, the effect upon the mind is much the same.'[52] This fact, *i.e.*, the all too common ignoring of the principle that 'the word is not the thing,' represents little that is new to a general semanticist.

Language, Campbell went on to state, is still further complicated by the relations which come to exist between words. Since words are thought of as things, the

[47] Among the most amusing of these is the following: He quoted from Dryden's 'Song for St. Cecilia's Day':

> 'From harmony, from heavenly harmony
> This universal frame began;
> From Harmony to harmony
> Thro' all the compass of the notes it ran,
> The diapason closing full on man.'

Then he commented: 'In general it may be said, that in writings of this stamp, we must accept of sound instead of sense, being assured at least, that if we meet with little that can inform the judgment, we shall find nothing that will offend the ear.' *Ibid.*, p. 274.

[48] *Ibid.*, p. 282.

[49] *Ibid.*, p. 283.

[50] *Ibid.*, p. 66-67. Italics mine.

[51] *Ibid.*, p. 283.

[52] *Ibid.*, p. 283.

relations of words 'are confounded with the things they signify; the consequence of which is that . . . we come insensibly to conceive a connection between them . . .'[53] Here, Campbell thought, lies the basic cause of nonsense in the world. When we deal directly with the names of objects, there is little danger, because recourse to the objects themselves is immediate and easy.[54] But when we deal with high abstractions where words are far removed from their 'archetypes in nature,' and when 'the mind' combines these abstractions and considers them as conforming with things in nature—then the danger enters. As Campbell put it:

> The mind, it must be owned, hath an unlimited power in moulding and combining its ideas. It often produces wonderful forms of its own, out of the materials originally supplied by sense: forms indeed of which there is no exemplar to be found in nature; centaurs and griffens, "Gorgons and hydras and chimeras dire." [55]

Campbell then lashed out at those philosophers, especially John Locke, who held that the mind is endowed with the power of formulating ideas within itself and that these ideas can be used as the bases of logical reasoning. He reiterated his position that knowledge can be based only on experience and that words and their relations must conform to things and the relations of things in nature. 'What,' he demanded, 'is the use or power of that idea, to which there neither is nor can be any archetype in nature, which is merely a creature of the brain, a monster that bears not the likeness of anything in this world?'[56]

[53] *Ibid.*, p. 284.
[54] *Ibid.*, p. 291.
[55] *Ibid.*, p. 288.
[56] *Ibid.*, p. 288-89.

Having delineated his theory, Campbell then turned to the cases wherein careless or 'unthoughtful' use of language leads to nonsense. First, he declared, the inordinate use of metaphors results in nonsense, because the speaker's words become 'not the immediate signs of his thought; they are at best but the signs of the signs of his thought.' [57]

The second cause of nonsense lies in those speeches 'wherein the terms most frequently occurring denote things which are of a complicated nature . . .'[58] Among words of this sort Campbell included: 'Government,' 'church,' 'State,' 'constitution,' 'power,' 'commerce,' 'proportion,' 'elegance,' etc. The danger here, although Campbell did not employ the term, grows out of the multiordinal character of the words:

> It will considerably increase the danger of our being deceived by an unmeaning use of such terms, if they are besides (as they very often are) of so indeterminate, and consequently equivocal significations, that a writer, unobserved either by himself or by his reader, may slide from one sense of the term to another, till by degrees he fall into such application of it as will make no sense at all.[59]

The third and principal cause of nonsense, Campbell maintained, is the excessive use of abstract terms which are not closely related to their archetypes in nature, and the combinations of which,

[57] *Ibid.*, p. 291.
[58] *Ibid.*, p. 294.
[59] *Ibid.*, p. 294. The solution to this problem, Campbell was aware, does not lie in the avoidance of such terms, because 'To attempt this in any tongue . . . would be to attempt the annihilation of the greater part of the language; for, in every language, the words strictly univocal will be found to be the smaller number.' *Ibid.*, p. 250-51.

therefore, lead to statements which may even contradict natural phenomena. We have already noted his views on this subject. Suffice it to mention here that as he illustrated the nonsensical use of abstract language, he again flayed the futility of most syllogistic reasoning. Thus his considerations of language, like his system of logic, brought him to a condemnation of the Aristotelian method.

What, then, shall we say of Campbell's contributions to the study of language? The most obvious remark is that his system is unacceptable in 1945. His conceptions of the laws which operate in nature are now known to hold for certain types of phenomena only. Secondly, like Hobbes, he failed to give enough emphasis to the role of the observer. While he recognized that the conclusions of 'moral reasoning' could not be accepted as infallible, he seemed to imply that, with more diligent investigation, it might be possible to know 'all' about something.[60] On the same point, he also seemed unaware of the fact that even the naming of an object (*i.e.*, a first order event) constitutes an abstraction of the event. Finally, while he recognized that the differences of particular objects are omitted in abstracting and that this omission continues with each further abstraction, he tended more in the direction of emphasizing similarities rather than the differences omitted.

But these criticisms tend to impose the knowledge of 1945 on a man writing in 1776. Taken from the standpoint of his own times, we can conclude with some degree of safety, it seems to me, that Campbell's theories were at least adequate for his day. Certainly his linguistic theory was among the most advanced of any presented up to his time. While Hobbes made significant contributions for 1651, it is not difficult to see the superiority of Campbell's analysis. Indeed, it seems remarkable that he was able, with the knowledge of his day, to anticipate so many of the principles of modern general semantics. The principles which he anticipated include: (1) recognition that the inductive scientific method must be applied to human as well as natural problems; (2) recognition that while we must operate on the conclusions derived by this method, those conclusions represent at best only high degrees of probability and must be revised when and if new facts are discovered; and (3) recognition that the unconscious process of abstracting and multiordinal terms are basic to the nonsense which language often imposes upon us. It seems not unsafe to conclude that were Campbell living now, after the development of non-euclidean geometries, non-newtonian physics, relativist logics, etc., he would be an avid reader of, if not a major contributor to, *ETC*.

[60] For example, Campbell declared, 'We are perfectly assured that iron thrown into the river will sink . . . because these conclusions are based on a *full* and uniform experience' (*Ibid.*, p. 65).

And a well-made language is no indifferent thing; not to go beyond physics, the unknown man who invented the word *heat* devoted many generations to error. Heat has been treated as a substance, simply because it was designated by a substantive, and it has been thought indestructible.

H. POINCARÉ, *The Foundations of Science*

✯ BOOK REVIEWS ✯

*Revision of Vision**

LANGUAGE OF VISION. By Gyorgy Kepes. Chicago: Paul Theobald. $6.95.

Whatever may be the language one happens to inherit, it is at once a tool and a trap. It is a tool because with it we order our experience, matching the data abstracted from the flux about us with linguistic units: words, phrases, sentences. What is true of verbal languages is also true of visual 'languages': we match the data from the flux of visual experience with image-clichés, with stereotypes of one kind or another, according to the way we have been taught to see.

And having matched the data of experience with our abstractions, visual or verbal, we manipulate those abstractions, with or without further reference to the data, and make systems with them. Those systems of abstractions, artefacts of the mind, when verbal, we call 'explanations,' or 'philosophies'; when visual, we call them our 'picture of the world.'

With these little systems in our heads we look upon the dynamism of the events around us, and we find, or persuade ourselves that we find, correspondences between the pictures inside our heads and the world without. Believing those correspondences to be real, we feel at home in what we regard as a 'known' world.

In saying why our abstractions, verbal or visual, are a tool, I have already intimated why they are also a trap. If the abstractions, the words, the phrases, the sentences, the visual clichés, the interpretative stereotypes, that we have inherited from our cultural environment are adequate to their task, no problem is presented. But like other instruments, languages select, and in selecting what they select, they leave out what they do not select. The thermometer, which speaks one kind of limited language, knows nothing of weight. If only temperature matters and weight does not, what the thermometer 'says' is adequate. But if weight, or color, or odor, or factors other than temperature matter, then those factors that the thermometer cannot speak about are the teeth of the trap. Every language, like the language of the thermometer, leaves work undone for other languages to do.

It is no accident historically that Mr. Kepes and other artists of similar orientation speak of 'the new vision' and the 'language of vision.' Revisions of language are needed. Every day we are, all of us, as persons, as groups, as societies, caught in the teeth of what the older languages leave completely out of account. We talk of a new, shrunken, interdependent world in the primitive smoke-signals of 'nationality,' 'race,' and 'sovereignty.' We talk of the problems of an age of international cartels and patent monopolies in the economic baby-talk of Poor Richard's Almanack. We attempt to visualize the eventfulness of a universe that

* This essay originally appeared as one of two introductory essays prefacing Mr. Kepes's *Language of Vision*. (The other was written by S. Giedion, author of *Space, Time and Architecture*.) Reprinted by permission of the publisher.

is an electro-dynamic *plenum* in the representational clichés evolved at a time when statically-conceived, isolable 'objects' were regarded as occupying positions in an empty and absolute 'space.' Visually, the majority of us are still '"object"-minded' and not 'relation-minded.' We are the prisoners of ancient orientations imbedded in the languages we have inherited.

The language of vision determines, perhaps even more subtly and thoroughly than verbal language, the structure of our consciousness. To see in limited modes of vision is not to see at all—to be bounded by the narrowest parochialisms of feeling.

What Mr. Kepes would have us do, then, by his attempt at visual re-education, is to compel us to take into consideration the 'refraction' of our inherited modes of vision. This he does by showing us what goes into visual experience. He gives us the 'grammar' and the 'syntax' of vision: what interplays of what forces in the human nervous system and in the world outside it produce what visual tensions and resolutions of tensions; what combinations of visual elements result in what new organizations of feeling; what 'visual statements,' apart from 'literary' or representational content, can be made with line, color, form texture, and arrangement.

Purposely depriving us of the easy comfort of all aesthetic stereotpyes and interpretative clichés, Mr. Kepes would have us experience vision as vision. Mr. Kepes's endeavor may perhaps best be characterized by the following analogy. To a Chinese scholar, the pleasure to be derived from an inscription is only partly due to the sentiments it may express. He may take delight in the calligraphy even when the inscription is meaningless to him as text. Suppose now a singularly obtuse Chinese scholar existed who was solely preoccupied with the literary or moral content of inscriptions, and totally blind to their calligraphy. How would one ever get him to see the calligraphic qualities of an inscription if he persisted, every time the inscription was brought up for examination, in discussing its literary content, its accuracy or inaccuracy as statement of fact, his approval or disapproval of its moral injunctions?

It is just such a problem that faces the contemporary artist, confronted with a public to whom the literary, sentimental, moral, etc., content of art 'is' art—to whom visual experience as such is an almost completely ignored dimension. The vast majority of us—and by us I mean not only those who profess to know something about 'art' but also the general public that delights in magazine covers and insurance company calendars and hunting prints and sailboat pictures —are sophisticated by our cultural environment *beyond* the point where it is possible easily to understand what people like Mr. Kepes are driving at. We have all been taught, in looking at pictures, to look for too much. Something of the quality of a child's delight in playing with colors and shapes has to be restored to us before we learn to see again, before we unlearn the terms in which we ordinarily see.

This restoration of vision, then, is what Mr. Kepes's 'grammar' of vision would accomplish for us.

The revision of the language of vision is not, of course, an artistic end-in-itself for Mr. Kepes. How we deal with reality is determined at the moment of impact by the way in which we grasp it. Vision shares with speech the distinction of being the most important of the means by

which we apprehend reality.

To cease looking at things atomistically in visual experience and to see relatedness means, among other things, to lose in our social experience, as Mr. Kepes argues, the deluded self-importance of absolute 'individualism' in favor of social relatedness and interdependence. When we structuralize the primary impacts of experience differently, we shall structuralize the world differently.

The reorganization of our visual habits so that we perceive not isolated 'things' in 'space,' but structure, order, and the relatedness of events in space-time, is perhaps the most profound kind of revolution possible—a revolution that is long overdue not only in art, but in all our experience.

S. I. HAYAKAWA

More than Ninepence Worth

THE A.B.C. OF PSYCHOLOGY, by C. K. Ogden. Penguin Books, Hammondsworth, England, 1944; 9d.

C. K. Ogden is the inventor of Basic English and Director of the Orthological Institute, Cambridge, England. Alfred Korzybski said (in *Science and Sanity*) of Ogden's work: 'The only determined attempt made, so far, to deal with the symbolic problems whose importance is stressed in the present work is that of the Orthological Institute. This research organization founded by C. K. Ogden is concerned with the influence of language on "thought" in all its bearings; and it is to be hoped that further endowment may be forthcoming to enable the scope of its enquiries to be extended to include *structure, non-elementalistic semantic reactions and non-aristotelian systems.*'

All those interested in general semantics will find this small volume relevant. It is a short, clear-cut exposition of the field of psychology wherein the subject treated with its limitations is placed alongside other studies such as sociology, philosophy, neurology, etc. The linguistic aspects and difficulties in comprehending and studying mental processes are stressed. Subverbal and verbal levels of thought are introduced by discussion of general animal, anthropoidal and infant activity. 'Thus the infant's early outfit consists of perceptions, not perceptions of colours, spots, sounds, and touches as such, but of expressions or patterns which favour or thwart his activities; and on this basis of perceptions he continues to build up his world, for it is a fundamental law of the mind that so long as it can it will use perceptions already acquired rather than form new ones. The child who calls a badger the first time it sees one a "bow-wow," and the philosopher who tries to bring new facts under his old headings, are obvious instances. Conversely, the child's comparatively undeveloped power of recognition and discrimination are due to its lack of experience of the ways in which signs change from situation to situation.'

The importance of changing from 'play' to 'games' in the mental growth of man is discussed. Ogden considers 'play' as activity of the child regulated by the child and dependent on his interests and imagination. As the child grows, he is introduced to 'games' which follow rules set by others and where the child is pitted against others. Thus Ogden feels that games come to represent elements of adult life and says 'Games in fact are one of the chief instruments by which the play world is broken down.'

'Man's Linguistic Heritage' is the most important chapter for readers of *ETC.* 'The importance of speech in human psychology is even yet, generally underestimated.' Animal vocalization is expressive of inner activity, while 'naming cries' are a human characteristic and vary with the state of affairs. We name because objects are alike. Animal and infant classifications are 'emotional' rather than 'objective'; the first classification of all is doubtless into satisfactory and unsatisfactory in respect of particular needs. 'The animal does not regard the cry as a name, a separate part even of the situation. This may help us to understand how it is that children, savages and even men eminent in the world of scholarship, so strangely and so persistently proceed as though the name were part of the thing—a tendency which is still exerting an evil influence upon thought.'

'At many points, language badly misrepresents the world as we know it. All current languages embody in their grammar and vocabulary an outlook which is passing away. The fact that we are forced to use nouns for what are essentially happenings rather than things (as when we say "an emotion," "a perception," "a thought," instead of an emotional, a perceptual, or a ratiocinative event) is an example. The struggle which psychology is having now to rid itself of a false 'atomism' and to arrive at 'dynamic' conceptions is primarily a struggle against a bad legacy in language.'

'Every statement is translatable and translation should form a chief part of intellectual training at all stages; not only translation from foreign languages into our own, though this is at present probably the most valuable part of the general curriculum, but also and still more urgently, translation from one formulation to another within the bounds of our native tongue. By this means, we may best look beyond our forms of speech and the things we are talking about.'

This book is valuable, not for new material but for the coördination and general review of Ogden's position. The book succeeds in keeping the difficulties of aristotelian frame and of disintegrating reactions in the forefront. Ogden does not abolish these difficulties but by constantly reminding the reader of the presence of unlike-structure linguistic formulations, he creates an awareness of these important problems.

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'Short Circuits'

PSYCHOSOMATIC DIAGNOSIS, by Flanders Dunbar. New York: Paul B. Hoeber, 1943. $7.50.

This is an important book because it introduces a new *method*. Psychosomatic medicine is both an attitude and a technique, according to Dunbar. The attitude is that of organism-environment continuum, never before so explicitly accepted in medicine. Multicausality is also postulated. The method is that of psychosomatic diagnosis, applicable in all fields of medicine and useful whenever personality structure and defenses are being evaluated.

Dunbar summarizes the method thus:

'(1) A method of history-taking has been developed which includes a history outline, together with a method of correlating observations of the emotional and physiological aspects of the course of illness that seems adequate to reveal the area of life adjustment in which the patient's major difficulties have occurred, together with his characteristic patterns of dealing with them.

'(2) This method of history-taking in itself not only serves to clarify the personality picture, but also benefits the patient:

(a) It releases more or less of the energy which for the patient was bound up in repressing unpleasant experiences and

(b) it almost always reveals to the patient an association between his symptoms and his emotional conflict.

'(3) There is evidence that a patient for whom thorough-going psychoanalysis is impractical or undesirable, may be benefited by a few hours (10 to 20) of psychotherapy directed towards increasing the awareness of the areas in which he is likely to have difficulties, together with the defects in his manner of attempting to meet these difficulties. This is usually sufficient to liberate energy from the disease process and redirect it.' (pp. 692-3)

Dunbar utilizes a notion of 'short circuit' which greatly resembles the general semantics formulation of non-delay of reaction. She says:

The same bodily agent (cerebral cortex) which organizes conscious material and behavior and is the register of associations and bahavior patterns, also probably organizes distribution of energy in the involuntary muscles and in the vegetative system. If the cortex is blocked out, the vegetative system will continue to function, but often in extremely unbalanced and abnormal ways. When a somatic short circuit occurs, it means simply that the cerebral cortex, which normally would have utilized a certain quantum of energy in a certain organization of external behavior, instead has to discharge this energy through the only other channels open to it, that is, through the involuntary and vegetative parts of the organism.' (p. 657)

Such a 'chronic disturbance of function tends to become crystallized in structural change.' (p 10)

A new factor in psychosomatic illness not previously pointed out is exposure to occurrence of the syndrome in associates who are not kin. This pseudo-hereditary conditioning was found more often than actual occurrence of the patient's disease in his relatives.

Dunbar proposes two 'suggested laws of emotional thermodynamics.' Conservation of vital energy, the first law, was first stated by Freud when he postulated that emotion has both a dynamic and an economic factor. Recent physiological research, Dunbar notes, does show us that changes in the body associated with emotional stimuli are basically changes in temperature, electric potential and chemical composition.

The second law states that if symptoms representing pathological outlets of vital energy are crystallized in permanent structural damage (of organs), the energy is by so much dissipated and becomes unavailable.

Dunbar studied 1600 patients who were serial admissions to Presbyterian Hospital, New York, 80 percent of whom were discovered by routine psychiatric examination to have definite emotional factors in their illnesses. They were admitted for eight syndromes usually considered organic. Other than the middle chapters (4 through 10) concerned with detailed accounts of the psychosomatics of these syndromes, the book is eminently readable by non-medical persons. Preventive aspects are stressed as they should be, because these eight syndromes account for most of the manpower wastage of chronic and disabling disease.

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Reading Conference

READING IN RELATION TO EXPERIENCE AND LANGUAGE; *Proceedings of the Conference on Reading, University of Chicago* (Volume VI); compiled and edited by William S. Gray. University of Chicago, 1944.

This monograph, recording the proceedings of the reading conference, reports several dynamic trends in the practice of reading instruction. For the most part, these concepts-in-practice run right through many of the papers delivered at Chicago, cutting across the five divisions of the material, and reflecting a direction and unity of thinking in the field seldom discernible in a conference on a subject of such breadth and depth. More than thirty-five people talking on a topic like reading in relation to experience and language could be forgiven for galloping madly off in many more directions than these people did.

Many other talks echoed the practical emphasis which Robert C. Pooley expressed in the sentence, 'With the language arts recognized as the vehicle of all learning and the indispensable means to educational and social self-realization, the ability *to do* becomes the criterion of success'; and several shared with him his approval of Lennox Grey's statement, 'We sense, if we do not clearly enough say, that democratic communication means two-way communication — not simply *communication to* but *communication with*. . . . The teaching of English . . . calls for . . . *specialization in interrelationships*.' Dora V. Smith expressed a shared thought in the words, '. . . we shall find it necessary to alter the emphasis of our teaching from one of ground-to-be-covered to one of powers-to-be-attained,' and also in her insistence that reading is not one basic skill, but several—differing according to the purpose of the reader, the nature of the material read, etc. William S. Gray, in his summary of the conference, was accurate in his emphasis that, 'These statements make it clear that the relationships among reading, experience, and language vary at different stages of pupil development and have wide implications with respect to the nature and the organization of instruction in all school subjects.'

A basic skill in reading is to preserve a balance between a reader's use of his previous experience in understanding new material he is reading, and a reader's understanding of the precise experience the author intends him to have. It is certainly true, as Paul B. Diedrich points out, that the reader can learn nothing which is entirely new to him—unlike any experience he has ever had. It is equally true, as S. I. Hayakawa illustrates in his paper, that all too frequently a reader's previous experience, which he sees as similar, perhaps because the language is similar, to the one the author intends him to have, is in reality not at all the same and leads to a total failure in comprehension. Diedrich has a pleasant time with an illustration of Alfred Korzybski's statement that no two chairs are alike. No semanticist has said that classifications are not useful and necessary, but to insist that experiences are not necessarily similar because they may be worded similarly is equally useful and necessary. Some perception by the reader of both the similarities and differences between past experiences and the experiences presented to him by the author (pointed out by some writers by such devices as significant details) is necessary to yield an experience which is at the same time recognizable and new.

RUSSEL H. FOWLER

Stephens College

✯ NEWS AND MISCELLANY ✯

Scripta Mathematica

The following letter received by Mr. W. Benton Harrison, Jr., of the New York branch of the Society for General Semantics, will be of interest to our readers in the New York area:

Dear Mr. Harrison:

Korzybski's lectures [New York, January 31 and February 1] seem to have made a wonderful impression on everyone present.[1] Several leading members of the Society of Friends of Scripta Mathematica have already requested that lectures by him be included in our schedule for 1945-1946.

We have received requests from several members of the Society for General Semantics to be put on our mailing list to receive notices about public lectures offered by us. . . . You may state that our lectures are open to them without charge and that invitations will be sent regularly to all those who will send in a request to Scripta Mathematica, 186th St. and Amsterdam Ave., New York 33.

I hardly need tell you that I consider it a high privilege to have been able to coöperate with your group in paying tribute to the distinguished founder and director of the Institute of General Semantics, Alfred Korzybski.

JEKUTHIEL GINSBURG, *Secretary*
Society of Friends of
Scripta Mathematica

[1] Combined attendance at the two lectures, according to reports received by *ETC.*, was around 850.

Psychological Round-Table

Under the sponsorship of the Individual Psychology Association, round-table discussions on 'Fear' (January 5), 'Dreams' (February 2), and 'Parent-Child Relationships' (March 2) were held at the Central Y.M.C.A. in Chicago. An unusual feature of the discussions was the participation of five 'schools of thought' rarely brought together for a comparison of points of view. The point of view of Analytical Psychology (Jung) was presented by Dr. Irene T. Mead; that of Individual Psychology (Adler) by Dr. Rudolf Dreikurs; that of Psychoanalysis (Freud) by Dr. Irene M. Josselyn (at the February meeting by Dr. Thomas M. French); that of Psychobiology (Adolf Meyer) by Ethel Kawin; that of General Semantics by S. I. Hayakawa. Some 150 persons were present at the first round-table; around 300 were present at both the second and third.

News from Detroit

Clarence L. Meader, emeritus professor of general linguistics at the University of Michigan and co-author (with W. B. Pillsbury) of *The Psychology of Language* (1928), has been giving each semester for the past three years a course in semantics at the Horace H. Rackham Educational Center in Detroit (University of Michigan Extension Department). The course is divided into two parts, which are described in the university announcements as follows:

'*The Science of Meaning* I. The series of eight lectures will consider the funda-

mentals of Semantics with special reference to the meaning of words in their bearing on daily life; the linguistic bases of sane thinking and sane conduct; the physiological and psychological foundations of meaning—the mind-body problem.

'*The Science of Meaning* II. The effective use of the mental processes and the specific application of Semantics to the problems of everyday life. Consideration will be given to the nature and effective use of language and especially to the value of Semantics to the professions (physicians, psychiatrists, educators, businessmen, etc.) and in the home; Semantics and social reconstruction; practical hints on the "correct" usage of words.'

Enrollment in this course has increased steadily from year to year, so that beginning in 1945 it is being offered in Flint, Michigan, as well as in Detroit, while another more advanced course has been added to the Detroit program. These courses, Dr. Meader feels, are the logical outgrowth of the work in biolinguistics in which he has been engaged since about 1912 and which has involved a good deal of intensive work in anatomy, physiology, medicine, physics, psychology, and sociology.

Dr. Meader has been teaching at the University of Michigan since 1893. Since his retirement in 1938, he has been more actively engaged than ever in such problems as the interrelations between language, thought, and direct action and the relation of semantics to education.

Coöperative Study of G. S.

In some colleges, general semantics presents an administrative difficulty: that of how to classify a methodological discipline within the 'departments' of the college. An interesting development and partial solution which is being tried this year in several institutions is to have coöperative study of general semantics by groups of the faculty, who then discuss applications of the methods in their own individual teaching situations.

Limited experiments of this kind are being tried this semester at Michigan State College and at Stephens College. These experiments point toward an interesting new field of application of general semantics as a part of in-service training programs for teachers.

Tavern Lawyer Draws Fine Line

Those who doubt that semantic manipulations are the principal business of the law are asked to consider the following item from the *Chicago Tribune*, November 21, 1944:

'Harold Snavely, operator of the 100 Club tavern in Highwood, who is alleged to have opened his establishment too close to a church, appeared before the Illinois liquor control commission yesterday to appeal the revoking of his license. Proceedings were delayed for more than an hour while his lawyer, Leo Bartolini, argued the difference between the physical and spiritual church.

'Bartolini, in an attempt to prove that the spiritual church if not the physical church was more than 100 feet from Snavely's tavern, as required by law, questioned the Rev. William G. Overend, pastor of the Highwood Methodist church, and Dr. George A. Fowler, superintendent of the Chicago northern district of the Methodist church.

'The Rev. Mr. Overend, a student pastor, said he could not answer Bartolini's question, but Dr. Fowler stated firmly: "There is a spiritual church, but the entire edifice is considered the church." The case was continued until Nov. 28.'

Linguistic Circle of New York

The following announcement has been received: 'The Linguistic Circle of New York announces the forthcoming publication of its journal, *Word*, to appear three times a year, the first number early in 1945. *Word* will present problems and viewpoints in the various branches of linguistic science, theotretical and applied, general and specialized, historical and descriptive. It will foster the study of language in its different functions, and in its relations to social, cultural and psychological phenomena. *Word* will offer articles, reviews of new publications, and notes and comments on activities in the field of language and allied fields in America and elsewhere. Subscription to *Word* is $3 a year; single numbers are $1.50. Subscriptions should be made out to the Linguistic Circle of New York and sent to: Wolf Leslau, Sec.-Treas., École Libre des Hautes Études, 66 Fifth Avenue, New York 11, N. Y.'

At Mount Pleasant, Mich.

A course in general semantics is being offered during the spring semester by Dr. Wilbur Moore, of the Department of Speech of Central Michigan College of Education. The course has the coöperation of the English, Speech, and psychology departments of the college and carries credit in any of these departments.

Introductory Lectures

A series of eight lectures, 'Introduction to General Semantics,' by Francis P. Chisholm, Ph.D., of the department of English, Stephens College, will be given at the Institute of General Semantics, 1234 E. 56th St., Chicago 37, on Tuesday and Thursday evenings, 7 to 9:30 p.m., from June 26 to July 19. Tuition for the series is $15.

Seminar-Workshop

The second annual seminar-workshop course in non-aristotelian methology and general semantics will be held August 13 to September 1, 1945. Thirty-six hours of intensive seminar training with Alfred Korzybski, author of *Science and Sanity*, will be scheduled in the afternoons and evenings during the first ten days of the course. The workshop, under the direction of M. Kendig, educational director of the Institute of General Semantics, assisted by Francis P. Chisholm and other lecturers and consultants, will consist of more than fifty hours of lecture-conferences, demonstrations, group and individual work in specific applications, and will be scheduled for the latter part of the course. *Enrollment is limited to thirty.* Some partial scholarships are available. Tuition for the three weeks course: $125. Twenty-five dollars of the tuition is due on registration.

Volume I, Bound

A few copies of *ETC.*, Volume I, bound in blue buchram with gold lettering, are now available. The price is $5. Individual issues of Volume I, in good condition, will be accepted in partial payment, twenty-five cents credit being allowed for each copy of Numbers 1 and 4, one dollar for each copy of Numbers 2 and 3, which are especially scarce. Persons sending in all four issues may have them bound, $2.50.

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What can be shown *cannot* be said.
L. WITTGENSTEIN, *Tractatus Logico-Philosophicus*

✯ CORRESPONDENCE ✯

'Color-Blind'

SIRS:

Here is an item that gave me a good laugh. Perhaps you can use it in *ETC.*

My friend Cpt. Akim is acquainted with an unusual case of 'color-blindness,' a person who claims he sees red instead of green and green instead of red. The problem presented by traffic lights has been solved very simply by this individual. He says he stops at 'green' and goes at 'red.' He has been that way all his life.

The Army recently rejected him on account of color-blindness!

OLIVER BLOODSTEIN
Somewhere in the
Southwest Pacific

Put Them in the Air Force!

SIRS:

Reading S. I. Hayakawa's mordantly cheerful article, 'The Symbolisms of Driving,' I was amazed that this usually original and resourceful writer had failed entirely to realize the implications of his text.

He describes so well the afflatus welling up in the psyche of repressed, frustrated people when they are behind the wheel of a fast moving car; he points out so nicely that the manufacturers cater, in the embellishment of their models and even in the names assigned to them, to this sensation; yet he fails utterly to realize the usefulness of his observation to mankind in its struggle for freedom from fascism. One is tempted to ask him if he doesn't know there's a war on.

Granting his thesis, the next step is to realize that the American Air Force, manned largely by blond, handsome, well-adjusted college graduates who would be welcome in white-supremacy households and restricted-clientele resorts, is making a colossal blunder in not grounding every one of these happy-go-lucky youths in favor of stunted, twisted, oppressed and frustrated lads from minority groups in blighted rural and urban areas.

Think of these unhappy demons, seated at the controls of a powerful plane, their eyes lit with the rage of mistreatment, their fingers curling around bomb release and machine gun trigger, given the opportunity to bomb and strafe the very people who have invaded the whole world with false concepts of race. Compare a happy-go-lucky Texan youth, who fights or bombs out of patriotism or sheer good feeling, with these men, and you'll see how much better the minority lads would be. Conceive of an air force made up of such terrors, aloft in instruments of aggression which makes your 12-cylinder super job seem like the one-hoss shay, equipped with more dashboard dials than even dreams are made of, fitted out to the last detail for killing, made with loving care to take in the furthest shadowy reaches of the symbolism of driving, riding thousands of feet above lowly earthlings.

Of course, it might leave us with just a mite extra in the way of postwar problems. Driving cars recklessly on civilian

streets at home, these products of oppression must feel some sense of guilt; certainly they know the law's on their tails. But imagine them dealing out death to hated strangers with all their pent up recklessness and being praised and decorated for it! Having their pictures in the paper! Being called 'Ace'! The mind reels, and wonders how they'd ever be tamed to peacetime subservience.

Several grim possibilities bother me at this point. Suppose these cookies couldn't fly so well if they got praised for it—maybe they'd get careful and proud, just like Aryans, and be useless. Or suppose that the short, dark, Negroid or Semitic man became the nation's ideal, through publicity attendant on bombing raids and dog fights—what would happen to the millions invested in blond beauty? Or suppose the Navy found they could use the same type, and the Army, and soon these despised boys would be the cream of the fighting crop: would that give them a position of equality in the postwar community, since they'd won the war, or would it make the white supremacy and restricted clientele folks pacifists? On the brighter side: suppose, at the end of hostilities, a canny member of the Slum-Town Sockers said, 'What say we finish up the home-grown fascists before we give up these guns?'

But I leave these problems to defter minds than mine: all I want to know is, doesn't Hayakawa know there's a war on?

A. C. SPECTORSKY

Editor, Book Week
Chicago Sun

Satya and Asatya

SIRS:

I came across one of the clearest examples of mistaken map-territory relationships I have ever seen, while reading *Mahatma Gandhi, His Own Story*, edited by C. F. Andrews (Macmillan, 1930) p. 225, and would like to pass it on to you.

> *Asatya* meaning 'untruth' also means *non-existent;* and *Satya* or 'Truth' means 'that which is.' If untruth does not so much as exist, its victory is out of the question. And Truth being that which is can never be destroyed. This is the doctrine of *Satyagraha* in a nutshell.

Here a structure of a part of the language appears to have led to the belief that this structure was a property of the universe rather than a property of the language only.

ROBERT SATTEN

Beverly Hills, California

Symposia and Round-Tables

SIRS:

Apropos of the debate between Leslie A. White and Jared S. Moore, reprinted in the Winter 1943-44 issue of *ETC.*, I should like to make the following *general* remarks concerning debates. These remarks, however, are not intended to criticize either sets of opinions expressed in this particular debate or the manner in which these two authors have expressed them.

The debate as a form of discussion clearly follows the lines of Aristotelian logic. It insists upon a 'two-valued' orientation. All views expressed in it are either 'right' or 'wrong,' depending upon the 'side' you happen to favor. This means that both participants must enter the ring with firmly established notions which they must consider, or at least pretend to consider, as absolutely true and which they must defend at all costs; as a last resort they may even sacrifice sense and sincerity, for a debater who would admit

that he was wrong, would go down ignominiously in defeat. The debate makes ample use of the incentives of pride and rivalry. It is pre-eminently a contest.

The round-table discussion, on the other hand, can include any number of participants within reason and can admit any number of possibly correct opinions. It requires no rigidly determined stand on the part of any participant; he only needs to be well informed on his subject. It is not at all dishonorable for him to admit that he has left the discussion with quite different views than those with which he entered it. He may even openly 'go over to the other side' in the very midst of the discussion—if indeed we can talk of clearly defined 'sides.' The striving for sincerity, exact information, and clarity of expression are the aims in a good round-table discussion, and never 'victory.'

Whereas a debate must lead to a final conclusion, establishing one side as 'right' and the other as 'wrong,' a round-table discussion has no such aim. It merely raises a number of questions, submits them to a searching analysis, and does not care whether in the end it has found any answers or merely raised additional questions. It may do either or both. Its function is not to 'settle' anything, or to pretend to settle it. Rather, it is to stimulate participants and audience alike to increased analysis and reflection upon the subject, so that they may arrive at conclusions more nearly in accord with the facts at hand.

Naturally, a round-table discussion, with its spontaneous give-and-take, is best suitable for publication after it has taken place orally, whereas a debate can be put into writing and can be published without this intermediate step. Still, the dangers inherent in it seem to me to outweigh this advantage.

The current trend toward replacing the debate by symposia and round-table discussions, a trend which is particularly noticeable in radio programs, strikes me as a hopeful indication of the timeliness of semantics. It is a trend which well deserves the attention of semanticists.

FRIDA ILMER

Oberlin, Ohio

Still Hash!

SIR:

During a temporary stay in a camp where grub was particularly vile, shortly after our arrival in India, I made the following experiment in the practical application of general semantics. I pointed out to my fellow-bitchers-about-the-food that hash $_{\text{Monday}}$ was NOT identical with hash $_{\text{Tuesday}}$. Neither was hash $_{\text{dinner}}$ identical with hash $_{\text{supper}}$. The recognition of this elementary truth was all that was needed to change a seemingly unbearable monotonous diet into a richly varied one.

(Capt.) ANATOL RAPOPORT

P.S. It didn't work.

MULTIORDINALITY

The only thing we have to fear is fear itself.

FRANKLIN DELANO ROOSEVELT (1882-1945)

Second Annual

SPECIAL SEMINAR TRAINING AND WORKSHOP COURSE IN NON-ARISTOTELIAN METHODOLOGY AND GENERAL SEMANTICS

August 13 to September, 1945

In response to the demand for more extensive training and drill in General Semantics and specific applications in the various fields of Education, in Mental Hygiene and Psychosomatic Medicine, in Communication, in Industry, in Law, Economics, etc., this new type of course will be offered again in the summer of 1945.

The *Seminar* will consist of thirty-six hours of class lectures by Alfred Korzybski, director of the Institute and author of *Science and Sanity: An Introduction to Non-aristotelian Systems and General Semantics.* These lectures will be scheduled in the afternoons and evenings during the first ten days, and in general will follow the pattern of the intensive seminars previously given at the Institute.

The *Workshop* will be directed by M. Kendig, educational director of the Institute, assisted by visiting lecturers and consultants in various fields, who will be invited to conduct lecture-discussion periods and assist individuals and small groups in working out special problems and materials. Some fifty hours of directed work will be scheduled in the mornings, afternoons and evenings. Students will work individually and in groups on materials and procedures which they expect to use in applying general semantics in their fields during the coming year.

Enrollment limited to thirty. Tuition for the three week Seminar-Workshop will be one hundred twenty-five dollars, including the twenty-five dollar registration fee, which must accompany the application for enrollment. Some partial scholarships will be available. By special arrangement, graduate credit for the Seminar-Workshop may be secured at various universities.

War conditions make it impossible to announce in advance the visiting consultants for the Workshop. Please secure registration forms and other information immediately and apply as soon as possible, so that the program can be planned to the best advantage of all the participants. Address the Educational Director.

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